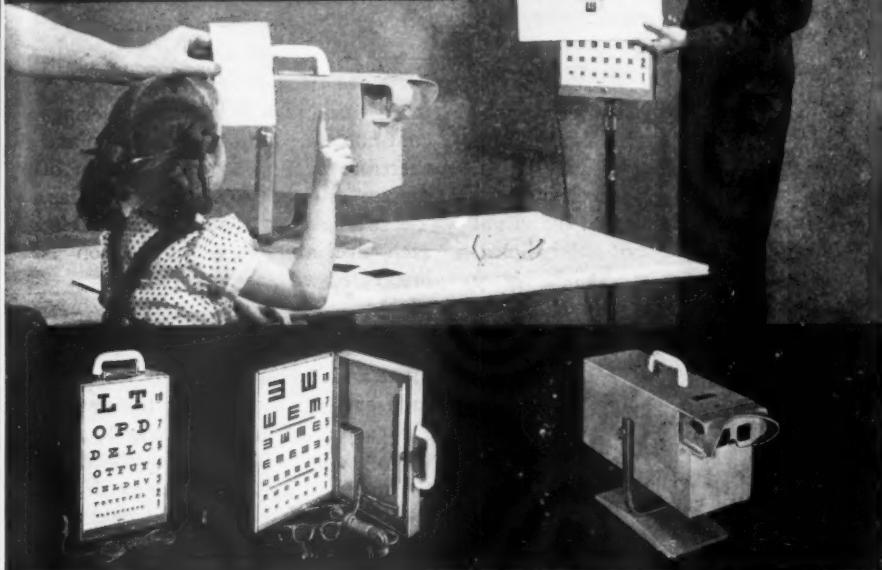


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# THE VISION OF THE PRESCHOOL CHILD

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A clear understanding of eye growth and the development of vision is essential in dealing with the problems of the child under six.\*

**V**ISION is a highly complex sense. It represents the integration of three entirely different systems which, when combined, produce a clear image in consciousness. They are: the visual pathway; eye movement and balance; and the higher centers. A disturbance or interruption in any one or all can result in a direct impairment of vision or disturbing and distressing side effects.

The visual pathway can be demonstrated anatomically and physiologically. It begins with the cornea of the eye and ends in the visual cortex of the brain. Light impulses travel through cornea, aqueous, lens, vitreous and are received on the retina where they become nerve impulses. These then continue through optic nerve, optic chiasm, optic tracts, optic radiations and finally arrive in consciousness in the visual cortex and higher centers.

The eye and retina may be compared to the receiver end of a long telephone line to real visual consciousness located in the brain. We see with our brains, not with the eyes alone.

The optic nerve actually is not a nerve at all as other peripheral nerves are constituted. It is differentiated

brain tissue with membrane coverings continuous with those of the brain and therefore subject to an extension of disease or influences in these areas. The whole visual pathway is double; each eye and nerve connection is integrated with the other.

## Complex Muscle Movements

The second system is that of movement and balance. Six muscles move each eye (seven, counting the eyelid) and each must move in a coordinated way with the other and with the six of the opposite eye. In other words, 12 associated movements must be maintained. These muscles are controlled directly by the third, fourth and sixth motor nerves and by complicated associated nerve tracts in the brain areas. A disturbance of a single muscle or any of the motor nerves supplying it can upset this balance and result in vision dysfunction. One can see that the possibilities of combinations of muscle errors are almost endless. Each differs from the other in some way. The treatment which helped little Johnny down the street may not help Joey at all.

The visual impulses striking one retina must travel through one eye and combine with fellow impulses in the higher centers of visual consciousness. The two images become superimposed and fused, forming a three-

\* Presented at the Annual Conference of the National Society for the Prevention of Blindness, Chicago, Illinois, March 26, 1956.

dimension, clear image. We call this third degree fusion or foveal coordination.

The third system in vision is just as real as the first two. We know it is there but we cannot see it nor demonstrate it by dissection. It is in the so-called higher centers of consciousness, including emotion, memory, perception, fatigue; also complex association pathways of vision with speech, hearing, handedness, eye dominance and others.

These three complex systems combine to give us vision. Let us now consider them separately and determine how disturbances of various types may impair eyesight.

#### **Detecting Disease**

We can determine the presence of disease in the optic pathways because we can see it or find it by examination. Examples are scars of cornea or lens, many types of retinal and choroid disease, optic atrophy, and any involvement of the remote connections anywhere along the line. The eye and the optic pathways are not isolated areas, but are closely associated with other structures and processes which may secondarily affect vision; the pituitary gland, the large vascular systems, and the effect of increased intracranial pressure of the fluids within the brain cavity. More remotely the thyroid, parathyroid and adrenal glands have indirect but definite influences on how well we see. For example, disease of the parathyroid gland can, through resulting calcium dysfunction, cause cataracts. Vision is therefore related to one's state of health, and disturbance of vision may arise from associated or relatively distant disease.

The glands of internal secretion

control the growth of children. The eye matures along with muscles, nerves, bones and other structures. The macula in the retina of a four-year-old has not developed to equal that of an eight-year-old. Visual acuity of the four- or five-year-old is often no better than 20/30 for this reason. Because of the growth of the eye myopia is greater at age 15 than it was at age 10, and hypermetropia (a smaller eye) is often less at age 15 than it was at age 10. An increase in myopia in children does not mean disease or loss of eyesight. The size of the eye, myopia, hyperopia, or astigmatism has already been determined by heredity and other factors in the development process, as are height, features and color of the hair.

We can instruct the student on proper reading habits, provide adequate lighting and correct his vision by proper glasses but these are aids and not cures for certain defects.

#### **Efficiency of Accommodation**

In further consideration of the growing and developing eye we find one mechanism more active and efficient in childhood than at any other time. This is accommodation, or the ability to focus rays of light on the retina. The seven-year-old can read ordinary print at a distance of one inch from the normal eye. Every day of his life this decreases an infinitesimal amount until at age 45 he requires reading glasses to see clearly at 14 inches.

As a child grows older, decreased accommodation is accompanied by an increase in exophoria for near. This is probably due to growth of the bones of the face and orbit secondarily. In the same way a convergent strabismus of certain types may become less as the child grows older.

### **Range of Focus**

Children vary greatly in their ability to overcome farsightedness when reading. By habit they hold books close to their eyes. They can read at four inches as well as adults do at 15 inches and still see perfectly at 20 feet or infinity. No camera can approach this range of focus. When Johnny holds a book close to his eyes it is commonly thought that something is wrong with his sight. He reads at six inches because he can, although he should read at 14 inches. Because a child has focusing power equal to a 13-diopter lens at reading distance we consider that hyperopia of two diopters or less without symptoms will not require glasses. Many children tolerate three diopters with no inconvenience.

There should be no tendency on the part of teachers or parents to limit reading or close work because of lack of accommodation or fear of injury to the normal eyes of children. Myopia and hyperopia can be measured and corrected by glasses when necessary even in infants as young as 10 months. The normal child is ready to read at age six as far as development of the eye is concerned, even though his distance acuity may be less than 20/20.

### **Effect of Glasses**

Parents often ask if glasses change a child's vision, "weaken his eyes," or "make him more dependent upon them." A lens worn in glasses bends the rays of light entering the eye to bring about a clear focus on the retina, particularly the fovea. When properly prescribed, this benefits in two ways: it brings about a clear image in consciousness; and it relieves the ciliary focusing muscle of abnormal effort, not of normal effort. Glasses do not

change the eyes. They change the direction of light coming into the eyes. I have never seen vision made worse by properly fitted lenses, but I have seen vision made better by them.

An excessive amount of hyperopia can embarrass vision more than nearsightedness, the more so since both distance and near vision are impaired, and frequently there is associated secondary muscle imbalance. In one case a six-year-old was labelled mentally retarded. When examined his hyperopia was +6.00 in each eye. This impaired both distance and near vision and explained his inability to learn in school. When a correction was made he had no difficulty.

### **Results of Muscle Imbalance**

The system of eye balance and co-ordination of the actions of muscles of one eye with those of its fellow and associated nerve connections govern our binocular vision. Certain disturbances in this balance result in blurring, headaches or, when more pronounced, double vision. While horizontal imbalances can be tolerated if not too pronounced, vertical errors of slight degree may cause distressing symptoms. Frequently this type of error is partly compensated for by tilting the head. This is a sign to be looked for but is not always a definite indication.

When a deviation becomes intolerable—horizontal or vertical—we have strabismus or squint, and vision in one eye may unconsciously be suppressed to avoid unpleasant double vision. Secondary changes occur in muscle action and treatment becomes more difficult. Unfortunately most non-paralytic squint begins between ages one and four, before school age. The child may show irritability and other

behavior problems as a result. The aim of treatment is to reverse these processes and to aid in bringing about normal eye coordination. Refraction and surgery, aided in some cases by orthoptics, may be necessary for correction.

I want to emphasize that orthoptics alone does not straighten eyes. It is an aid when properly used; it is wasted time and needless expense to the patient when improperly used. The purpose of orthoptics is to teach the child how to make the best use of his eyes. How can we recognize the need for orthoptics? The answer is easy. We cannot until the necessary information has been determined by examination.

#### **Early Treatment Essential**

The treatment of amblyopia resulting from suppression of vision in one eye is most effective in infancy and childhood. Habits of seeing are formed early, and the chances for restoring vision by occlusion of the good eye become gradually less and less up to the age of six or seven. Early treatment of strabismus gives the best results by either method. We now do not hesitate to prescribe glasses for infants of one year or younger where indicated. Where possible, major correction should be made before school age to avoid comments from the other children, and to avoid the disturbances of muscle imbalance—irritability, nervousness, and personality changes.

The third system of vision—the higher centers—is responsible for more misleading information to the examiner than either of the other two. Emotion, fatigue, distraction of attention, poor perception, may on first examination lead to the belief that organic defects are present in the eye itself. We

cannot ignore the complaints of children regarding vision difficulties; however, I know of no way to differentiate functional and organic other than by elimination through routine testing. Emotional states may reduce vision by 80 per cent or more. Such states are very real to the child and their handling and treatment may require special care. Fatigue can result in many types of muscle imbalance and, through lack of attention, reduce visual acuity. This may be due to low thyroid metabolism, anemia, or low-grade infection; thus it may be difficult to evaluate the symptoms and say whether the eye or the general health is the basic cause.

In doubtful cases a complete physical examination may be necessary. A child's attention span is short. A thing must be of unusual interest to gain his attention for as much as 10 minutes, and he is easily distracted by noises and people. For this reason the best screening tests are short and are done without disturbing elements. It is best to use a single letter or line rather than the whole chart.

#### **Problem of Mirror Writing**

Mirror writing is a disturbance of the association pathways of the higher centers. I am sure that many five- and six-year-olds experience mild degrees of this when learning to write. Eye doctors see only the more pronounced cases. Frequently it is associated with handedness and speech difficulties. Efforts to disentangle these confusions may or may not be helpful. I have never seen a child who failed to recover from mirror writing; growth and time are the greatest factors.

It is difficult to estimate how many thousands of school-age children have

been aided in their development and learning processes as a result of vision screening programs carried on throughout the country. Public health and school nurses, school administrators and teachers, social workers and others deserve much credit for this fine record. Many children must be screened to find the few who need the help. The determinations by these testing groups are more accurate year by year. In

Detroit the number of over- and under-referrals has become less and less.

The aim of the present program is to reach into the preschool group of children not yet covered by available workers. The National Society for the Prevention of Blindness has pioneered in this field. We as ophthalmologists heartily support this work as well as the National Society's other achievements in blindness prevention.



**EARLY DETECTION OF EYE PROBLEMS**—At the invitation of the American Academy of Pediatrics the National Society presented this exhibit at the Academy's October meeting in New York City. The charts and photographs describe signs of early eye trouble and methods of detection.

Here Mrs. Archie Samuels, left, a volunteer, with little Kimberly Smith and Mrs. Florence Cunningham, NSPB nurse consultant, demonstrate vision testing for four- and five-year-old children. Over 500 pediatricians visited the booth, observed the demonstrations and requested information on testing vision in their offices.

# OPTICAL AIDS FOR SUBNORMAL VISION

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Recent developments in this hitherto neglected field have already produced significant results.\*

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OF THE more than 300,000 legally blind in the United States 60 per cent have a little sight. This ranges from vague light perception, recognition of hand movements and counting fingers at one foot or more to the reading of the Snellen 200-foot character by the corrected better eye at various distances up to 20 feet. Impaired vision has been roughly classified according to the major resulting disability. Vision below 4/200 is considered social blindness since those so afflicted cannot travel without some aid. Vision corrected to 20/200 or less in the better eye is termed occupational, economic or legal blindness. Since a child with a corrected acuity below 20/70 cannot progress well in the regular classroom without special educational help this group has been designated the partially seeing. Optical aids could lower the limit probably to 10/200 or less.

For those who recognize hand movements only, no optical aid is helpful nor should optical aids be fitted unless the ocular pathology is reasonably stationary. An optimistic outlook is warranted, however, if a person can read large headlines with his ordinary

correction and desires a magnifying device to read newsprint, provided he has enough motivation to persist in its use. With optical aids the partially sighted frequently can read and also continue in occupations when otherwise they could not. A musician, for example, can by this means learn his music and then play from memory.

## Improvement of Distance Vision

Visual impairment, like hearing impairment, can be classified as a disorder of conduction or perception. The conduction of a clear visual image to the retina may be impeded by errors of refraction, conical cornea, irregular astigmatism of cornea or lens, or opacities in cornea, lens or vitreous. The pinhole disk is a simple diagnostic instrument that differentiates the conductive and perceptive types of visual impairment. The pinhole produces a remarkable visual improvement in a conduction impairment that is not too diffuse or extensive; but it further worsens the vision in perceptive deterioration. An unrestrictive all-around improvement of distance vision by an optical device is possible only in a conduction impairment.

Should the impaired vision be due primarily to a refractive change, an adequate correction will provide even better vision than that through the pinhole, owing to the greater amount

\* Presented at the Advanced Workshop for Teachers and Supervisors of the Partially Seeing, Syracuse University, August 21, 1956.

of light entering the eye. With the passage of time a healthy eye is subject to changes in refraction; a diseased eye even more so. When dealing with amblyopic vision certain modifications in the methods of refraction are required. The test distance is shortened to 10 feet and large letters from 20/800 down are used. In the monocular amblyope a doubling of acuity by a refractive correction, as from 5/200 to 10/200, means relatively more than an improvement from 20/40 to 20/20 in the better-sighted. An imperfect correction detracts from the help derived from a magnifying device since the blur effects of significant astigmatism are likewise enlarged by magnification.

In afflictions of the cornea such as conical cornea, discrete opacities and irregular astigmatism after injury, though a pinhole improves acuity, no spectacle lens may prove to be of value. In such cases the contact lens may solve the problem and restore excellent acuity. Multiple-pinhole spectacles are an efficient alternative but may not be accepted because of the more or less distracting light mosaic produced by the pinhole pattern. Perhaps some modification of the distribution design will be better tolerated. Pinhole spectacles were used successfully by a patient with old trachomatous scarring of the corneas. His unaided acuity was 20/100 in each eye and he had tried vainly to get corrective glasses. With the stenopeic spectacles his vision for distance was 20/25+, and he read 4-point type. These stenopeic spectacles may aid also some cases of incipient cataract no longer helped by glasses. Pinholes made in a clip-on occluder should be a more effective arrangement when-

ever a correction gives some visual improvement.

Contact glasses are of particular value in unilateral aphakia, thus providing binocular vision; and are indicated also in high myopia. A myope of -20 D. thereby gains a 45 per cent enlargement of the image, a full field and elimination of corneal astigmatism, at the same time avoiding the prismatic and peripheral distortions of strong spectacle lenses.

The telescope is the only optical device that aids vision for distance regardless of the type of ocular pathology. However, the observer must maintain a stationary position, since telescopic magnification is accompanied by a corresponding magnification of motion and reduction of field. The expanded retinal image lessens also the apparent brightness of an extended object. A low-power telescope such as the Kollmorgen prescription unit or the less expensive Lamont<sup>1</sup> or Wollensack<sup>2</sup> sport-glasses may be helpful for viewing the chalkboard and demonstrations at school, and at the theater or cinema. All of these can be fitted with various near-vision additions. The chief advantage of such Galilean telescopes is their short overall length, but because of the small field of view the highest practical magnifying power is not much more than two. The 3-power sport-glass has an achromatic objective and its field is approximately 13 degrees. With each increment of telescopic magnification the field of view constricts—at first rapidly, then more gradually. In the Zeiss telescopic units the field for 1.3-power is 40 degrees; for 1.8-power, 24 degrees. Telescopic spectacles are unnecessary for watching television because adequate magnification is ob-

tained by getting close enough to the screen. A patient of mine who can only read with 14-power magnification still watches and enjoys television.

A relaxed hyperopic eye or one made so optically or by surgery, as in aphakia, has an inherent minus refractive state equal to the power of the plus lens required for correction. Under such conditions a single weak plus lens held at a suitable distance from the eye produces the magnification of a Galilean telescope. For example, if a person who is emmetropic naturally or with correction holds a +0.75 D. lens before his eye at an arm's length of  $66\frac{2}{3}$  cm., he sees a distant object magnified twofold. Since the focal length of the lens in this case is  $133\frac{1}{3}$  cm., the focal point of parallel rays is  $66\frac{2}{3}$  cm. behind the eye, rendering the eye 1.5 D. hyperopic for these rays. The eye and the lens are in telescopic adjustment as the difference of the focal lengths is  $66\frac{2}{3}$  cm., the distance that the lens is held before the eye, and the magnification is  $133\frac{1}{3}$  cm. divided by  $66\frac{2}{3}$  cm. or two. This weak lens with its wide, clear field and remarkable depth of focus can be used also for less distant objects, such as reading a typewritten letter on the wall 4 feet away, with only slight loss of magnification; or a +1.25 D. lens can be used for this purpose.

Though a person with 8/200 vision and an intact field can travel unaided, he cannot read street signs nor identify buses. For this purpose a pocket telescope is useful, such as the 8-power prismascopic or the 6-power penscope.<sup>3</sup> The field is only 6 to 8 degrees but it is large enough to follow moving objects if held in a steady hand. Hand telescopes will also help an amblyopic workman keep his eye on a distant gauge.

#### Aids for Near Vision

For near vision, magnification of varying degrees can be accomplished by five types of devices: loupes, high plus additions, telescopic units, aplastic magnifiers wedged in a spectacle lens and apparatus for projection enlargement. The records should note three things: the visual aid used, the size of type read and the reading distance; stating, for instance, "with +4 D. addition reads 5-point type at 10 inches." As increasing magnification inevitably reduces both reading distance and field, the amplification should be no greater than is required for the predominant needs of the patient. The final test should be determined not on any reading chart but on the actual material of interest—magazines, music, textbooks, telephone directory or market reports—as the quality and texture of the paper, the contrast and sharpness of the printing are all significant factors.

*Loupes.* An ordinary convex lens is the simplest type of magnifier and is widely used as a hand reading glass or loupe. The best form is usually plano-convex with the flat face toward the eye since the image quality averages better over the whole field when the rays emerge from the plane surface. The useful field is limited not only by the diameter of the lens but also by its marginal aberration, and seldom exceeds 10 to 12 degrees. The field decreases also as the distance of the loupe from the eye increases. Though aberration can be reduced by a suitable hyperbolic surface, such glass lenses are far too expensive to market. For example, the Zeiss cataract Katral lens, no longer made, sold wholesale at \$29 per lens in 1920. However, a

reading lens in this form is available now in molded transparent plastic and covers sharply a much larger field than its spherical counterpart.

When a convex lens is held in front of printed matter at less than its principal focal length, an enlarged virtual image results which is projected some distance beyond the lens. Because of this the optical magnification is always greater than the actual retinal magnification. For instance, the objective magnification is twofold if a +12.5D. lens is held at half its focal length from the page, but on account of the distance of the image the subjective magnification is 36 per cent less for print 18 cm. from the eye. If the loupe is held at three-fourths its focal length from the page, the virtual magnification is fourfold but that of the retinal image is only twofold under the same circumstance. Since the effects of a strong lens vary considerably with its distance from the object, a fixed distance should be maintained by a supporting device. Relatively weak powers, however, such as +8 or +10 diopters, may be held in the hand. A larger sharp field than is obtainable with a simple lens can be secured by a doublet consisting of two similar plano-convex elements of crown glass mounted with the convex sides almost touching. Various loupes with built-in illumination, supplied by a battery or the general current, provide the reading matter with shadowless lighting of sufficient intensity to be of additional help, especially in perceptive depression.

Magnification compares the image seen with an optical device with the largest image obtainable without it. The nearest point of distinct vision of the normal eye is conventionally set at

10 inches or 4 diopters vergence. The enlargement produced by a magnifier is found by dividing 10 by its focal length in inches. Conversely, the focal length or approximate working distance is determined by dividing 10 by the magnification. Thus a 5x Hastings magnifier has a working distance of 2 inches. The diameter of the field of view is always somewhat less than the focal length. A 20x magnifier has a focal length of  $\frac{1}{2}$  inch and a field of view of about  $\frac{3}{8}$  inch. Depth of field refers to the distance that a magnifier can be moved toward or away from an object and still maintain a sharp image. Depth of field shrinks, along with the working distance, as the power increases. To gain the best viewing conditions the magnification selected should be the lowest that is effective.

*Spectacle magnification.* A simple spectacle magnifier consists of ordinary spectacles fitted to give one or both eyes a closer focus. Magnification is obtained by simply reducing the reading distance. With strong near additions the magnification is one-fourth of the total dioptric power added. Thus if the addition is +8 D. the print is magnified twofold but the vision is fixed to the principal focal plane of 8 diopters or 5 inches. The retinal image from an object at 5 inches is twice as large as that from the same object at 10 inches—the conventional near point.

The closer to the eye a high plus addition is placed, the larger the field—always an important matter. Any lens or lens combination used as a loupe can be mounted in a frame and used for spectacle magnification. This has been done with simple magnifiers, doublets and triple aplanats. Never-

theless, there is a difference in their optical action. The loupe must be held within its focal length; but in spectacle magnification the object must be precisely at the anterior focal point; and as long as this maintains the posterior rays are parallel, no accommodation is exercised and the distance of the lens from the eye does not affect the image. Hence the additive lenses can be placed in a headband, as in the Magni-focuser, or attached by a swivel clip to the distance lens of the better eye, as in Behr's spectacle loupes—an inexpensive device commonly used by jewellers. A useful model of the Magni-focuser<sup>8</sup> has +10 D. lenses ground on prisms which permit binocular vision if both eyes function about equally. Behr's spectacle loupes can be rotated readily in or out of position and are available in focal lengths of 6 to 1.5 inches, equivalent to a range of 7 to 26 diopters.

In bilateral amblyopia of an equal moderate degree both eyes may be fitted with high plus additions, up to 6 diopters, as better vision, a larger field and a greater depth of focus are to be expected from binocular vision. The difficulty lies in the problem of convergence. A person with an inter-pupillary distance of 6 cm., fixing a point at one meter distance, exercises 6 prism diopters of convergence. A shift of the fixation point to one-third meter or 13 inches requires three times the convergence, or 18 prism-diopters, which is almost the limit at which prolonged convergence can be maintained without undue fatigue. By adding prism base-in to each lens the convergence can be sufficiently relieved to bring the near point to 8 inches or 5 diopters of optical vergence. An additional base-in effect can be secured by

setting the lenses at less than the true interpupillary distance.

For monocular vision the American Optical Company provides high plus additions of 8, 16 and 24 diopters. By using a spot diameter of 25 mm. they have minimized but not eliminated marginal aberration. Lederer of Australia has computed the best form of spherical surfaces for an object at the anterior focal-point and has produced lenses with magnifications of 2.5 to 6 that result in a notable enlargement of the clear field. He has used these lenses successfully in over 700 patients. Bier of England has obtained an even larger sharp field by using plastic aspherical lenses with magnifications of 3.5 to 6. Fonda has fitted high plus additions in over 500 cases, going as high as 16 diopters or a magnification of 4. As magnification increases, the reading material must be brought closer to the eye and in the shadow of the face. The good lighting that is essential must come in from one side or be placed directly over the head of the reader. High plus additions have the advantages of simplicity, economy and conventional appearance and are to be preferred where applicable. Occasionally the blurred image of the more amblyopic eye interferes with that of the seeing eye. Placing a minus lens of sufficient power over the more amblyopic eye is cosmetically acceptable and just as efficient as a Chavasse or other occluder.

*Telescopic Aids.* Several types of telescopic aids are available. The cheapest is a monocular appliance of twofold magnification that can be clipped over the spectacle lens of the better eye. In the Kollmorgen series the telescopic units give 1.7 and 2.2 magnification, and the accessory ele-

ments—a distance correction and a reading addition—snap on to the rear and front of the telescopic unit respectively, thus adding to the flexibility though also to the weight of the appliance. The maximum magnification available for near is 6.6, with the use of a 2.2 x telescopic unit and a +12 D. reading addition. This is equivalent to the magnification of a simple plus addition of 26.5 D. but with the telescopic spectacle marginal and chromatic aberrations are less and the focal point is 3 inches instead of 1.5 inches, a more advantageous arrangement. A telescopic lens for near use usually requires a minimal plus addition of 4 D., which places the visual plane at 10 inches. The field with a 1.8 x unit is then 8 cm. and becomes 1 cm. less with each 0.2 increase in telescopic magnification. The field also constricts as the reading addition becomes stronger, lessening by 1 cm. to 0.5 cm. with each diopter added. Telescopic spectacles for near that provide 3.5 magnification have a field of 5 cm., the width of the narrow newspaper column found in tabloids.

The Univis telescopic lens, introduced by Policoff in 1936, is a Steinheil cone in which flint glass lenses of index 1.74 are separated by barium crown glass. The fused cone is inserted in the patient's distance correction at the position that a bifocal segment occupies. This gives the spectacle a bizarre appearance but also certain advantages — lightness in weight, adaptability to any type of frame, and a portal for distance vision above the telescopic cone. A cylindrical correction, if needed, is ground on the ocular surface of the telescopic unit, which comes in two magnifications, 1.5 and

2. Reading additions of +4 D. to +10 D. are placed over the front of the cone.

Bechthold and Feinbloom independently have designed air-spaced compound lens systems that give up to 14 and 20 magnification respectively. Lightness is achieved by using plastic lenses and incorporating the correction into the near lens. These types, as well as high plus additions, have been called microscopic lenses, a label that is confusing, though in both cases the term is justified by the dictionary which defines a microscope as a lens or combination of lenses for making magnified images.

*Triple Aplanats.* The triple aplanat is a cemented triplet, 15 mm. in diameter, consisting of a double-convex lens of crown glass between two negative lenses of flint. The design was popularized by Hastings and his name is now attached to this combination. The triple aplanat gives a sharp, flat field of approximately 30 degrees that is free from chromatism and distortion. The loss of light is minimal since there are only two air-glass surfaces. For 7-power its field diameter is 30 mm., while that of a 7-power simple doublet is only 18 mm. A 7-power Hastings lens has the same magnification as a plus 28 D. addition but without the distortions that limit the resultant field. A 2-power telescopic unit with +14 D. reading addition magnifies also 7 times, but though the reading distance is double that of the Hastings lens the field is much smaller.

Policoff first conceived the idea of inserting a triple aplanat into a carrier lens of the patient's distance prescription. The triple aplanat is inserted completely through the lens and so positioned as to correspond to the

patient's usual reading level. The appearance is similar to the Univis telescopic lens which Policoff also introduced. The triple aplanats are available in a wide range of magnification: 3, 5, 7, 10 and 14—and are cheaper than a comparable telescopic device since triple aplanats of all powers are still available as war-surplus items.

The American Optical Company mounts a 10 x triplet in a plastic carrier that has no distance prescription, but a Chicago firm has no difficulty in fitting the triplets in glass or plastic prescription lenses, thanks to an apparatus developed years ago for manufacturing an original type of bifocal. The triple aplanat itself, like the Bier and Lederer lenses, cannot incorporate a correction, but a slight variation in the focal distance is sufficient to compensate for most ametropia.

At The Chicago Lighthouse the triple aplanat is the favorite appliance for aiding severely amblyopic vision. Of the last 50 persons examined at its optical aids center, 28 sought work at The Lighthouse, 14 were referred by ophthalmologists and 8 by social agencies. Of these 50, 15 could not or would not use the aid. All but 6 of the remaining 35 were fitted with triple aplanats: 16 with 7-power; 8 with 10-power; 2 with 3-power; and 1 each with 5-power, 8-power and 14-power. A young woman with bilateral central scotomas and a visual acuity of 10/200 in each eye reads 5-point at 3 inches with a 5-power aplanat, which she prefers to the Feinbloom lens previously worn. She is working as a full-time typist at The Lighthouse. A man with Leber's optic atrophy and 6/200 acuity in his better eye reads 5-point at 3 inches with a 7-power triplet and is thus able to follow specifications as

supervisor in the blind shop. A referred case with bilateral macular degeneration and 9/200 in the better eye was fitted with a 7-power triplet with which he read 6-point print at 3 inches. After a month's use he reported that he read a book page in half the time he needed when the aid was first used.

*Projection Enlargement.* Magnification of opaque material by projection from a Balopticon is familiar in the classroom. In an adaptation of this instrument reading material is placed face down on a transparent plastic plate above the apparatus and projected from behind on a screen below. A surrounding bar controls the movement of the material laterally and vertically. The contrast is sufficient to permit viewing in a normally illuminated room. Two types are available in a differing range of magnification. The Franklin Institute model, marketed by the American Optical Company, enlarges 3 x and 5 x and is useful for those with vision around 15/200. The Megoscope, sponsored by the American Foundation for the Blind, is designed for greater magnification, 12 x and 25 x, and has been helpful in some cases with vision as low as 3/200. After adequate practice the apparatus allows reading in a relaxed manner at a comfortable distance. These expensive instruments are available for trial at the various visual aid centers.

#### Clinical Survey

Minor degrees of amblyopia are satisfactorily handled with standard ophthalmological equipment when a prescription is simply a high plus addition, a hand-held or headband magnifier or a clip-on telescopic attachment. Higher degrees of amblyopia, how-

ever, pose a problem. Fonda relies mainly on very high plus additions. At the Walter Reed Army Hospital, Levi and King found plus additions of 5 to 20 diopters inferior to telescopic devices. In their report of 33 successful cases having a visual deterioration from 20/200 to 4/200, 12 were prescribed Kollmorgen units and reading additions of 4 to 12 diopters, 13 were given Feinbloom spectacles with magnification of 2 to 8, and 8 were fitted with Univis telescopic units and reading additions of 4 to 10 diopters. The Chicago Lighthouse relies mainly on the triple aplanat.

Visual aids are apparently valueless if the corrected acuity is below 4/200 or the counting of fingers at 2 meters. Recent reports indicate that above this minimum only half of the severely amblyopic cases can be fitted with visual aids. In a trial of the Feinbloom lenses on 175 cases, Freeman found that 23 per cent could not be helped by the aid, and that an additional 32 per cent did not care to use it.

Those with rigid habits have difficulty in adjusting to a very close reading distance. A compromise arrangement is possible in which a weaker reading addition is combined with a hand loupe but few such persons like this complicated arrangement. Some examiners have fitted those with equal amblyopia in both eyes with different reading additions. The wearer of telescopic spectacles finds no objection to a set of two or three near-vision accessories. A woman with incipient cataract in her only eye whose corrected acuity was 20/130 was fitted with a 2.2 x telescopic unit and attachments of +4 D. and +8 D., with which she enjoyed the theatre, played the piano and followed the news.

Kestenbaum stated that the amount of plus addition required to read 9-point type is the inverse of the designation of distance acuity expressed in a simple fraction; that is, if the corrected distance vision is 20/200 or 1/10, +10 D. is required; if 20/100 or 1/5, then +5 D. To read the 6-point type of the telephone directory the addition would need to be one-third stronger. This general statement has many exceptions. Visual impairment of the conduction type generally responds better to a visual aid than do perceptive disorders. In opacities of the cornea or lens the near vision may be relatively much better than that for distance, or vice versa. One young man had both eyes so seriously injured in a battery fluid explosion that one eye was enucleated and the other left with extensive corneal opacities and an unimprovable 20/200 vision. Nevertheless, a 1.7 x telescopic unit with +4 D. reading addition allowed him to read 4-point type. In small demarcated macular lesions the spreading effect of magnification may give an acuity far better than anticipated.

Since the field of view is reduced by every magnifying device, such aids are seldom efficacious in advanced degrees of retinitis pigmentosa, glaucoma or optic nerve atrophy where the peripheral visual field is already very contracted. In less advanced cases of this sort a reading slit in black cardboard is a useful accessory by helping to keep the place, concentrating the attention and masking off the light from nearby brighter areas. In incipient cataract a reading slit reduces veiling glare and often effects a remarkable improvement in reading vision. One such patient who could just decipher 9-point type with his presbyopic addi-

tion read 4-point easily with the reading slit.

A period of adequate training should precede the prescription of any aid as the patient will resent the purchase of any device with which he cannot read satisfactorily. With repeated examination the patient's interpretation and adjustment are so improved that less magnification is finally necessary than first seemed indicated. One woman with a +7 D. addition barely read 5-point words, but on the second visit read with facility 4-point with only a +5 D. addition.

#### The Visual Aid Center

In the past few years institutions for the blind have established visual aid centers as an additional facet of their rehabilitation programs. In the visual aid center is assembled a complete armamentarium of optical aids with a trained technician in charge to determine that which is most advantageous for the individual tested. As the visually handicapped are for the most part financially handicapped also, these projects are almost completely subsidized as in the Industrial Home for the Blind in Brooklyn, The New York Lighthouse and The Chicago Lighthouse. In referrals of private patients the charge is only that of the actual outlay for the appliance and the technician's time. In The Chicago Lighthouse the average time spent, including adequate indoctrination in the use of the appliance, has been four hours and the cost to the patient \$75 to \$95. The results have justified this expenditure of time, money and energy. One paying patient was so enthusiastic that he donated an extra \$100 to the institution.

These centers have not only aided numerous semi-blind individuals but have inspired a revival of interest in this hitherto neglected field which has already produced significant new developments. Thanks to the enterprise of A. L. Severson, until recently executive director of The Chicago Lighthouse, the Wieboldt Foundation is subsidizing research on the following key problems:

The types of ocular pathology that lend themselves to effective use of optical aids.

The relative advantages and disadvantages of the various types of aids.

Psychological and other factors which lead to the acceptance or rejection of aids.

The extent to which a patient continues to use an aid and the effect of its use in his life.

The increasing knowledge and experience that result from such research will probably confirm that a sharp delimitation on the basis of visual acuity and ocular pathology is inadvisable. Intelligence and background, cooperation, perseverance and will to learn are all modifying factors.

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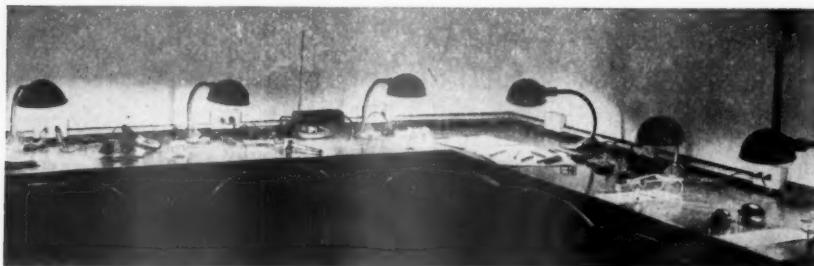
1. Selsi Co., Inc., 29 East 22nd Street, New York 10, N. Y.
2. Bausch & Lomb Optical Company, Rochester, N. Y.
3. American Foundation for the Blind, 15 West 16th Street, New York 11, N. Y.

**REPRINT AVAILABLE**—"Social and Emotional Adjustment of School Children with Eye Handicaps." From the Fall 1956 Issue, *Sight-Saving Review*. 8 p.; 5 cents.

## Display of Optical Aids at Braille Institute

A VISUAL aids room maintained by the Braille Institute of America in Los Angeles is equipped with more than 55 devices which have proved to be of benefit to the partially seeing. The aids vary from approximately two to 20 power in small lenses to greater strength in stand devices. Most of this equipment has been provided by the ophthalmological section of the Los Angeles County Medical Association.

Appointments are made by clients either at the suggestion of their physicians or because they have heard about the exhibit. An Institute staff member devotes as much time as necessary to helping each client determine which type of optical aid is most effective in his particular eye condition. J. Milton Johnson, Institute director of social welfare, reports that two out of three of these visitors have found devices that are decidedly help-



A corner of the visual aids room showing lighting arrangement and smaller devices.



Two stand magnifiers and a display of various types of lenses.



A group of magni-focusers of varying strengths.

ful to them. In such cases they are given detailed information as to where the equipment may be purchased. Additional information on aids not on display is available.

#### ROLE OF THE FAMILY DOCTOR

"Changing Problems in the Prevention of Blindness" was the subject of an exhibit presented by the National Society at the Eighth Annual Scientific Assembly of the American Academy of General Practice, held in Washington, D. C., March 19-22.

More than a third of a million Americans are totally blind, the exhibit explained. A million others are blind in one eye. It is estimated that 750,000 persons now enjoying sight will become blind, half of them needlessly.

Gains have been made against certain diseases. In the last 50 years blindness due to ophthalmia neonatorum has been cut by 98 per cent and children's eye injuries by 37 per cent.

Between 1940 and 1950 blindness from infectious diseases was cut 48 per cent in children and 23 per cent in adults.

However, the incidence of blindness is increasing. Today's longer life span means an increased prevalence of cataract, which causes one-fifth of adult blindness, and of glaucoma, responsible for one-eighth. It is estimated that more than a million Americans over age 40 have early signs of glaucoma. Diabetes has become an important predisposing factor, and more than 8,000 babies have been blinded by retrolental fibroplasia, a wholly preventable disease.

The exhibit emphasized the vital role which the family physician can play in educating his patients in proper eye care.

Miss Helen Demary, executive director, and Mrs. Martha Elliott, health educator, of the Prevention of Blindness Society of Metropolitan Washington, cooperated in this project and were in attendance at the exhibit during the meeting.

# SCHOOL VISION SCREENING

## A Comparison of Two Methods

ELEANOR B. GUTMAN, M.D., M.P.H.\*

Portland, Oregon

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Report of a study undertaken by the Oregon State Board of Health in relation to needs of the local school vision program.

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VISION screening of school children, while widely accepted in principle, has long been a matter of debate in terms of methodology and technique. Much has been written and many studies have been conducted in an attempt to select a single simple and efficient device whereby children needing professional eye care may be picked from their peers. Results of the extensive St. Louis study, published in 1954 by the Department of Health, Education, and Welfare,<sup>1</sup> ascribe some merit to each of the various screening methods now in common use but conclude, in effect, that the higher the degree of specificity of any test, the higher also the ratio of "incorrect" to "correct" referrals.

To the physician called upon to advise on school vision screening in his community—be he general practitioner, health officer, school physician or specialist in diseases of the eye—the fine balance of merit and drawback may prove confusing. In 1954, in an effort to resolve this dilemma in relation to local needs, the Oregon State Board of Health undertook a comparison study of two screening methods, namely the Massachusetts Vision Test

and Snellen testing coupled with teacher observation.

Teacher screening by Snellen test plus observation has been the recommended procedure in Oregon schools for more than 50 years. Public health nurses, serving the schools through local health departments, have aided teachers in the techniques of screening and in the subsequent referral and follow-up of cases needing professional eye examination and care.

The Massachusetts test was chosen as the comparison method of study because of its embodiment of standard diagnostic components—Snellen symbols, Maddox rod and plus sphere lens—as well as for its simplicity of operation. The interim report of Crane, Scobee and Foote<sup>2</sup> in 1952 credited this test with a relatively high level of correct referrals *in relation to* its over-referrals. It was felt, therefore, that the Massachusetts test would most nearly meet our criteria for a simple battery of standard tests to contrast with the fundamental Snellen test supplemented by the operator's subjective judgment.

Altogether, some 6,500 elementary school children in three Oregon counties were screened with one or both of the chosen test methods, conducted by a special operator (nurse-consultant

\* Director, Vision Conservation Section, Oregon State Board of Health, August 1951 to September 1956.

on the state board of health staff) or by the classroom teacher. An overlap group of 1,533 children were tested by both methods, bringing the total sample to better than 8,000 tests.

The three counties selected for study represent a cross-section of rural, small urban and peri-metropolitan populations, served variously by ophthalmologists, optometrists and eye-ear-nose-and-throat physicians. Vision screening in those areas has been conducted yearly by classroom teachers and their findings entered on a cumulative school health record of each child. From this source the reports of teacher-determined visual acuity of 3,100 children were tabulated.

#### Procedure for Testing

All children were tested with and without glasses if such had already been prescribed. Referrals for professional eye examination were made on the basis of failure of either MVT, Snellen test, or observation, by those not already wearing glasses or under current eye care. *Basic failures*, however, were recorded for all who failed without glasses on regardless of previous prescription—thereby establishing a baseline of the prevalence of eye defects in this group.

Referrals were made by letter to parents, advising eye examination by doctors of their own selection. Reports of eye examination were returned to the health department for compilation and follow-up by public health nurses where indicated.

Standards for failure of the Massachusetts test were established on a mean of recommendations made in prior studies by Sloane and Gallagher,<sup>3</sup> Yasuna and Green,<sup>4</sup> and Benton<sup>5</sup> and

approved by the Oregon State Medical Society's Committee on Conservation of Vision as follows:

I. Visual acuity—failure to read 20/30 line with either eye, at 20 ft.

II. Hyperopia—ability to read through plus lens, 20/20 with one eye or 20/30 with both; +1.75 diopter lens 1st and 2nd grades; +1.50 3rd grade and up.

III. Phorias—failure of Maddox rod test for 1.25 prism diopters hyperphoria; 6 prisms esophoria or 4 exophoria at 20 ft.; 6 prisms esophoria or 8 exophoria at 14 inches.

Standards for Snellen/observation screening were those which have pertained for the past several years in Oregon, classified as follows:

1. Visual acuity—failure to read 20/30 with either eye at 20 ft.

2. Observation—*a*. Gross signs of pathology or anomaly (ptosis, strabismus, etc.); *b*. signs of stress on visual performance (squinting, peering, head tilt, etc.); *c*. symptoms or complaints referable to vision (pain, blurring, double vision).

One trained operator, the nurse consultant, performed all except 365 of the Massachusetts tests. This small group, representing approximately 10 per cent of the total MVT sample, were Massachusetts tested by the medical director of the project *in addition* to being screened with Snellen test plus observation by the nurse consultant—in order to avoid duplicate testing by one operator. An additional 818 children in one county (Deschutes) were subsequently screened by Snellen testing and observation by the nurse consultant, who might be considered here as representing any highly trained

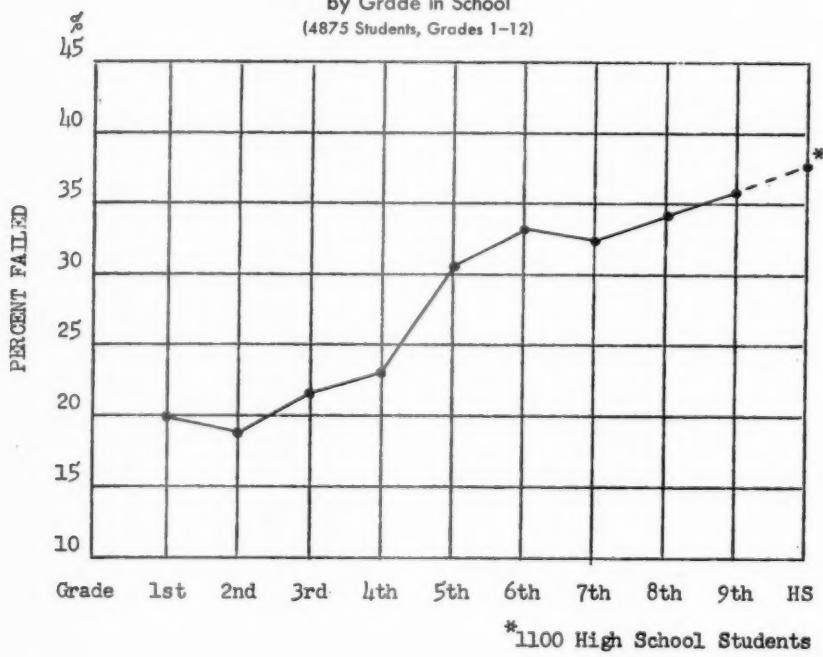
**TABLE 1**  
**Failures on Massachusetts Vision Test**  
**by County Tested**  
**(Grades 1-9)**

County	No. Tested	Basic Failures		Referred	
		No.	Per Cent	No.	Per Cent
Deschutes (pop. 20,300).....	1001	248	24.8	157	15.7
Klamath (pop. 42,100).....	1207	328	27.1	184	15.2
Mult. (P.R.) (pop. 110,400).....	1567	440	28.0	286	18.3
Total.....	3775	1016	26.9	627	16.6

and highly motivated screening specialist. Teacher screening, however, was performed by classroom teachers without special preorientation or emphasis in relation to the total study.

Twenty-seven per cent of the 3,775 children screened by MVT failed some part of the test without glasses. Less than half of these, 10 per cent of the total sample, were already fitted with

**FIGURE I**  
**Basic Failures on Massachusetts Vision Test**  
**by Grade in School**  
**(4875 Students, Grades 1-12)**



**TABLE 2**  
**Failures on Vision Screening**  
**According to Screening Test and Operator**

Test and Operator	No. of Children Screened	Per Cent Total Failures (Basic)	Per Cent Snellen Failures (Basic)
MVT by NC*	3775	26.9	16.4**
Sn/Obs by NC....	1185	29.4	17.5
Sn/ by Tchr....	3104	..	11.7

\* Nurse Consultant (+ 365 by M.D.)

\*\* MVT Part I

glasses or under eye care; the remaining 17 per cent were referred for professional eye examination (Table 1.).

The prevalence of basic defects disclosed by this test is modulated by age, increasing from 18 per cent in 2nd grade pupils to 37 per cent in high school (Figure I). Since the Massachusetts test embraces a battery of three component tests, prevalence was determined for *each* component in terms of the part first failed (Figure II):

MVT Part I, which is purely an abbreviated Snellen test, contributed 61 per cent of all basic failures and disclosed a rising prevalence by grade.

Part II, the plus sphere test for hyperopia, provided 13 per cent of basic failures with a sharp prevalence peak at 3rd grade. (It was at this grade level that the +1.75 lens used for the younger children was replaced by a +1.50 sphere. No doubt had the stronger lens been used beyond this

grade, the high number of failures at that level would have been reduced.)

Part III, Maddox rod test for muscle imbalance at distance and near, provided 26 per cent of basic failures in a relatively flat prevalence curve for all grades.

Twenty-nine per cent of the 1,185 children screened by the nurse consultant on Snellen testing plus observation failed without glasses. Failure of the Snellen test alone comprised 59 per cent of the basic failures or 17.5 per cent of the sample.

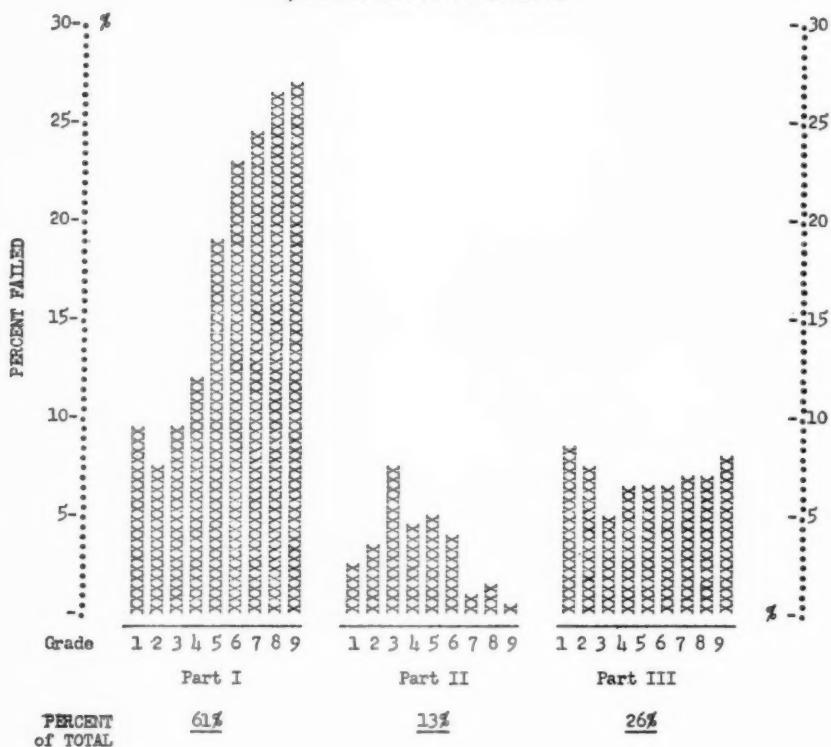
Basic failures on teacher screening were noted on 12 per cent of 3,104 health records, and were nearly all Snellen failures. Snellen test results had been entered on better than 96 per cent of the records studied, while notations of observation were only rarely present. It is possible, therefore, to compare teacher screening here only with Part I MVT or Snellen testing by the nurse consultant (Table 2).

**TABLE 3**  
**Uncorrected Visual Acuity on Refraction**  
**of 95 Children Failed on Snellen Screening by Nurse**

Status of Prior Correction	No. of Refractions Reported	No. with V. A. on Refraction*		Per Cent 20/70 or Worse
		20/20-20/50	20/70-20/400	
Referred (no Glasses).	58	34	24	41
Previous Glasses....	37	7	30	81

\* Poorest eye, uncorrected

**FIGURE II**  
**Basic Failures on Massachusetts Vision Test**  
**by Grade and Part First Failed**



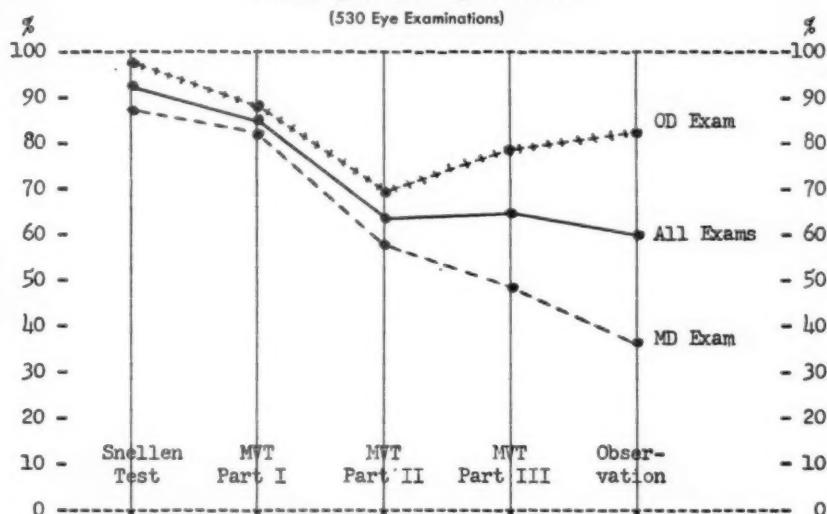
Of the Snellen failures noted on teacher screening 57 per cent were already wearing glasses, while among those found by the nurse only 37 per cent had glasses. Eighty-one per cent of the latter had, on subsequent refraction, basic visual acuities of 20/70-20/400 before correction. Among those *without* prior prescription only 41 per cent showed this degree of impairment when refracted; the remainder ranging from 20/50 down to 20/20 (Table 3). It is apparent that the more severe defects—in terms of visual acuity—had already been found and brought

to professional care either through teacher screening or self-referral on the basis of symptoms.

#### Results of Eye Examination

Reports of professional eye examination were obtained on 392 children who failed the Massachusetts Vision Test and 138 referred on observation or Snellen test. Just under half of the 530 examinations were conducted by physicians (48 per cent) and the remainder by optometrists (52 per cent). Reports were tabulated in terms of care recommended or deemed not

**FIGURE III**  
**Care Recommended by Professional Examiner**  
**According to Screening Test Failed**



necessary—glasses, visual training, surgery, or continued professional supervision being interpreted as "care recommended."

The over-all percentage of care recommended for each component test was as follows:

	Per Cent
Snellen test (nurse consultant)	92
I	83
MVT—Part first failed II	63
III	64
Observation (nurse consultant)	60

These figures fail, however, to indicate the considerable divergence between the two professional disciplines in judging the necessity for care in certain of the referral groups. As shown in Figure III, there is a very close parallel in the care recommended

by physicians or optometrists for referrals on visual acuity (Snellen test, MVT I) but increasingly wide disparity on plus lens and Maddox rod test failures and referrals on observation.

#### Diagnosis and Care

Initial reports of eye examination were submitted on a simple form already in use in the schools. Upon receipt of each such report a detailed questionnaire, under the signatures of four members of the Oregon Interprofessional Committee on Eye Care, requested diagnostic information and the specific prescription or recommendation made. The 262 questionnaires which were completed represent a 74 per cent response on the part of optometrists and oculists alike.

Hyperopia was the most frequently reported condition, comprising 47 per

cent of all diagnoses. Myopia made up 27 per cent of the whole and ocular pathologies less than 3 per cent. While nearly all myopia was found on Part I MVT or Snellen screening, hyperopia and/or hyperopic astigmatism necessitated multiple tests—one-third being revealed by the Snellen component and the remainder by MVT II or III or observation.

In terms of care recommended, however, 90 per cent of the diagnosed myopias were judged to need care, in contrast to 40 per cent of the simple hyperopias and 82 per cent of hyperopic astigmatism (Table 4). The differences in professional philosophy, noted in relation to Figure III, were particularly apparent with respect to hyperopia.

Details of lens prescription were reported in 158 cases, with spherical corrections ranging from  $-.50$  to  $-8.0$  for the myopias (median  $-1.25$ ), and from  $.25$  to  $+4.0$  (median  $.75$ ) for the simple hyperopias. Visual training was prescribed in 35 cases diagnosed eso- or exophoria, and surgery in two instances of exotropia.

#### Discussion

From the foregoing data it is apparent that neither of these multiple tests (Massachusetts or Snellen plus observation) can be judged as a single

entity. The differences between the various component tests, between the skills and training of persons conducting the screening, and between the basic disciplines of the professional specialists from whom referred cases seek care—all make for a complex constellation of variables. For this reason one cannot read any great significance into the close correlation between the 73 per cent recommended for care on MVT referral and the 74 per cent of those referred by Snellen plus observation.

Far more significant is the dominant position held by the Snellen component of both screening methods. This one test contributed two-thirds (67 per cent) of the cases for whom care was recommended by *all examiners* and three-fourths (75 per cent) of those recommended by physicians. This represents a high level of screening efficiency since only 1 out of every 7 children referred by the Snellen component proved *not* to need care. To find the remaining third of cases requiring care (by medical standards only the remaining quarter), it would be necessary to submit to professional examination nearly double that number of children. The decision as to whether the severity of cases found in this group justifies the cost to parents and the time of professional eye spe-

TABLE 4  
Diagnosis and Correction of Refractive Errors  
Referred on Massachusetts Vision Test

Diagnosis	No. Diagnosed	Care Recommended	
		No.	Per Cent
Myopia.....	70	63	90
Simple Hyperopia.....	32	13	40
Hyperopic Astigmatism.....	34	28	82
Hyperopia + Phoria.....	59	45	76

cialists can be determined only on a local basis and on the recommendation of a professional advisory group.

#### Summary

1. Vision screening by trained operator yielded 27 per cent basic failures on Massachusetts test and 29 per cent on Snellen test plus observation.

2. The Snellen test alone yielded 12 per cent basic failures when performed by teachers, as compared to 17.5 per cent when conducted by the special operator and 16 per cent by the same operator on the abbreviated Snellen test which is Part I MVT.

3. Sixty per cent of all basic failures were derived from the Snellen test and Part I MVT, with 85 per cent of them judged in need of care in the opinion of physicians and optometrists alike.

4. Sixty-four per cent of failures on Parts II and III MVT and 60 per cent on observation were judged in need of care, with wide variation between physicians and optometrists.

5. Seventy-five per cent of the cases for whom physicians recommended care were referred on failure of either Snellen test or Part I of the Massachusetts test.

6. Myopia accounted for one-quarter of the professional diagnoses and received 90 per cent correction or care; hyperopia, which comprised nearly half of all diagnoses, merited care in 82 per cent of hyperopic astigmatism but only 40 per cent of simple hyperopia.

#### Conclusions

By direct comparison both the Massachusetts Vision Test and the Snellen test coupled with observation will, when performed by a trained operator, yield equivalent numbers of

referrals for professional eye examination. One component common to both—the Snellen test—has a high degree of efficiency with but one "over-referral" in seven when failure to read 20/30 with either eye is used as the criterion of referral; yet it discloses from two-thirds to three-fourths of all cases professionally meriting care. The subsidiary tests—plus lens, Maddox rod, or observation—produce an additional small group of cases which merit care but do so with a high ratio of over-referrals. The importance of finding these additional cases must be measured in terms of cost to parent and community, in relation to the severity of cases thus found.

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REPRINT AVAILABLE—"Medical Social Work with Eye Patients." From the Fall 1956 Issue, *Sight-Saving Review*. 8 p.; 5 cents.

## BLASTING CAPS DESTROY EYES

LAST April the three small sons of a Long Island farmer were exploring the farm to which the family had moved a few months before. In the barn they found a blasting cap and some dynamite which the previous tenant had stowed away in some corner and forgotten. The boys had probably never seen a blasting cap, and ten-year-old George, curious to see what was inside the shiny cylinder, pounded it with a hammer. It flew into a thousand pieces, and the blast ignited the dynamite. George was instantly killed, and his younger brothers were critically injured.

A month later a 16-year-old boy, while his sister looked on, experimented with a blasting cap he had stolen from a construction shack. This New York City boy knew something about these detonators—that is, he knew that they would make a big bang, and that this particular type could be set off by an electric current. Robert touched the detonator wires with a flashlight battery. A few minutes later he and his sister Magdalina were being rushed to the hospital, screaming in agony. Both were dreadfully burned in face and body, and Magdalina was blind.

Tragedies of this sort are by no means rare. Even few adults know what a blasting cap looks like, or what it can do. It is the size of a pencil stub, but it packs such lethal power that it can blind a person 200 feet from the

blast. These caps of copper or aluminum contain a potent and extremely sensitive explosive which can be set off by a fuse or by electricity—or even by a boy's penknife. When the cap explodes it bursts into tiny bits of sharp, red-hot metal propelled with tremendous force, so that they can easily penetrate through every layer of the eye.

### Extent of Eye Injuries

It is impossible to estimate how many children have received eye damage or loss of sight in blasting cap explosions. Often several children are leaning over the cap as it is set off, which increases danger to the eyes. An NSPB study in 1949-1950 found 33 school-age children totally blind from this cause, but this is only part of the story.

Also incomplete are the figures on child accidents from blasting caps as compiled by the Institute of Makers of Explosives, which for years has had a safety program. During the last three years the Institute received reports of 407 blasting cap accidents which killed, maimed or blinded children. This represents a decline, for in 1929 alone 344 such accidents were reported.

### Educational Program

The problem is far from simple. The Institute has recently found that accidents no longer are concentrated in

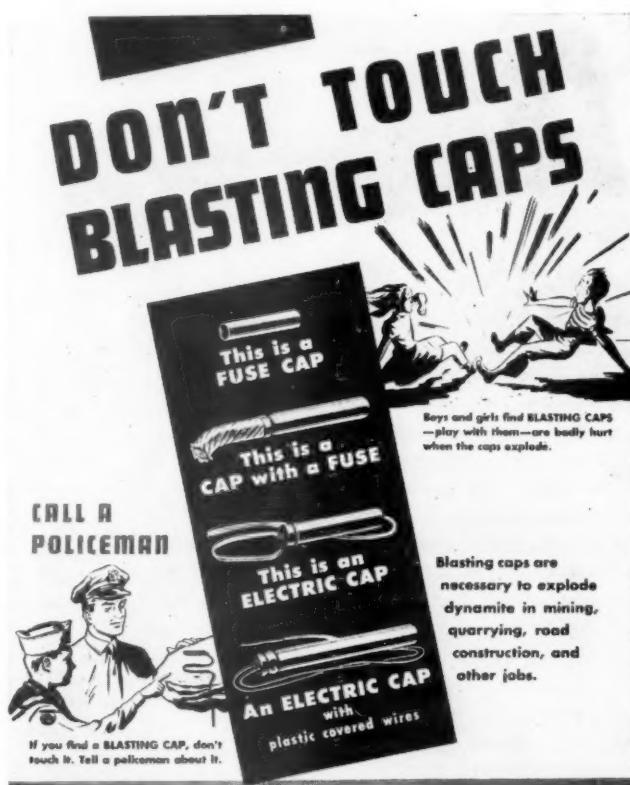
one of two counties or a state, but are widely dispersed. This is related to the increase in highway and pipe line construction, a pattern which is sure to be accelerated in the next few years. Farmers, too, use explosives to clear their land. Richard F. Webster, secretary of the Institute, says: "We have been working with the county agents of the Agricultural Extension Service to educate farmers to the dangers of leaving explosives in accessible places where curious youngsters can find blasting caps."

Most blasting cap accidents occur to boys aged six to 14, and there are 15 boys injured to one girl. Children find the caps chiefly in farms, barns and outbuildings, and in abandoned mines.

#### Safety Measures

The advice to all who buy explosives is simple: Keep a careful inventory of all blasting caps, and keep the caps under lock and key at all times when they are not actually in use.

A tragic accident reported in an Arizona newspaper is the sort of warn-



Over half a million copies of this poster are distributed annually by the Institute of Makers of Explosives to inform children about the dangers of blasting caps.

ing to which the most callous and careless user of explosives would listen: the money cost to him if an accident resulted from his negligence. Under the headline, "Boys Injured in Cap Blast Win \$190,256 Verdict" is the story of three teenage boys who had been hanging around a mine near Tucson. They made friends with the watchman, and discovered that the blasting caps were kept in an unlocked vault. One day, when the watchman was away from his post, they stole a box of 200 caps. Once off the premises they built a fire and threw in a few of the caps to see what would happen. What happened was an explosion so tremendous that it set off the box of caps near the fire. One boy was blinded in both eyes and another in one eye, and the youngest of the trio, aged 12, lost his left arm and leg. Their damage suit won in a superior court which held the mine owners and the watchman negligent in not locking up the caps.

#### Material Available

The Institute has material to offer schools, youth groups, and prevention of blindness agencies. For some years the 16 mm. film, "Blasting Cap!" has been available without charge, and two television shorts, of one minute and three minutes duration, are now distributed as a public service. There are kits with posters, leaflets and a study-discussion sheet for use by teachers and group leaders.

Since few people know a blasting cap when they see one, the Institute is now issuing display boards mounted with actual (but of course empty) caps of the fuse and electric types. This is the sort of visual aid which is bound to attract a child's attention. And his teacher or Scout leader can easily sub-

stitute for the thrill of the unknown the thrill of doing the right thing about an extreme danger. Children are told, keep away from these things, keep everybody away. Find a policeman, a fireman, or somebody with authority, and let him dispose of the cap.

Some years ago the driver of a school bus looked in the mirror and saw that two boys were dealing out a generous trove of caps to their cronies. He was a war veteran, and he lost no time. He stopped the bus, sternly collected every last cap, took them to a safe place, and delivered the children at school—not, by the grace of God, at the hospital. Every school child in the country should hear this story.

The National Society has issued many warnings about blasting caps, and hopes to alert all prevention of blindness agencies to the opportunity of educating the public about this tangible, wholly avoidable danger to sight and to life itself. Groups wishing to distribute educational material and to secure an exhibit of blasting caps may write directly to Richard F. Webster, Secretary, Institute of Makers of Explosives, 250 East 43rd Street, New York 17, N. Y.

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#### DR. BENEDICT NAMED ADVISER

Dr. William L. Benedict of Rochester, Minnesota, was appointed a member of the National Advisory Council on Neurological Diseases and Blindness on September 24. The group advises the Surgeon General on the research program of the National Institute of Neurological Diseases and Blindness.

Dr. Benedict has been a member of the Board of Directors of the National Society for many years and served from 1948 to 1955 as chairman of its Research Committee.

## Patz and Kinsey Receive Lasker Award

FOR their achievements in discovering and confirming the role of high level oxygen in retrorenal fibroplasia, Arnall Patz, M.D. and V. Everett Kinsey, Ph.D. received a joint Albert Lasker award on November 15. The presentation was made at the Atlantic City meeting of the American Public Health Association, with seven medical scientists and two health organizations cited for their contributions to the national well-being.

The citation of Dr. Patz, an ophthalmologist in private practice in Baltimore, emphasizes his "notable imagination and persistence" in studying the cause and prevention of RLF.

"Based on a review of previously occurring cases," the citation goes on, "Dr. Patz observed alternate small premature babies kept at the routine high oxygen levels and at levels below 40 per cent oxygen. Seven of the 28 babies kept at the high levels were affected. There were none among 31 maintained at levels under 40 per cent.

"This critical observation prompted experiments with animals, which were finally successful. Newborn animals kept at high oxygen levels developed a condition like that in babies, while litter mates not so exposed did not.

"These studies were part of the evidence on which a coordinated investigation involving 18 hospitals and 75 ophthalmologists and pediatricians was based and which has now produced conclusive and definitive proof of the relation between high oxygen concentrations and this blinding condition . . .

"In this instance the persistence of an individual ophthalmologist against considerable obstacles is notable. . . .

Using at first his own resources, he sought clinical and laboratory facilities to try out his theory. . . . He has set a standard for other practitioners by his undiscourageable search."

As Dr. Patz's investigation widened, he was given support by the Prevention of Blindness Society of Metropolitan Washington, the E. Matilda Ziegler Foundation, the U. S. Public Health Service, and the National Society for the Prevention of Blindness.

When the National Cooperative Study of Retrorenal Fibroplasia was set up in 18 hospitals in 1953 Dr. Kinsey, assistant research director of the Kresge Eye Institute, Detroit, was chosen as coordinator and the Institute acted as the coordinating base. Dr. Kinsey's full report of the study was published in the *A.M.A. Archives of Ophthalmology* for October, 1956. The study was supported by the U. S. Public Health Service, the National Foundation for Eye Research, and the National Society.

The citation of Dr. Kinsey praises his outstanding work as coordinator of the national study which confirmed the cause of RLF. He had participated in previous research which had eliminated possible etiologic agents other than oxygen in the pathogenesis of RLF.

"Within a period of six months data were accumulated through the cooperative study that would have taken a single hospital several years. Among babies weighing less than 1,500 grams at birth, 25 per cent of the infants receiving routine oxygen developed cicatricial retrorenal fibroplasia, while only 6 per cent of the infants on cur-

tailed oxygen had the condition. The study showed that limiting the oxygen was without effect on survival.

"In the United States alone, putting into effect the results of this coordinated research should prevent blindness in several hundred premature infants each year.

"To Doctor Kinsey and his associates in this study, the American Public Health Association pays high tribute for their achievement."

Doctors Kinsey and Patz each received an illuminated scroll, a gold statuette of the Winged Victory of Samothrace, and a check for \$2,000.

The other winners of 1956 awards are Alan Gregg, M.D., William P. Shepard, M.D., Jonas Salk, M.D., Karl Meyer, M.D. jointly with Francis O. Schmitt, D.Sc.; the Food and Drug Administration, in commemoration of a half century of service; and the Medical Care Program of the United Mine Workers of America, for "a model program of health services."

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#### LOSS OF SECOND EYE

That one-eyed employees are prone to accidents entailing the loss of the second eye is indicated in the 1955 report of the Missouri Division of Workmen's Compensation. On the list of those suffering a second injury to a given part of the body were 680 cases involving the eyes as against three to the body as a whole, 148 to the arms and hands and 99 to feet and legs.

In Missouri the employer is liable only for a second injury taken by itself, and the state is liable for excess compounded compensation. A one-eyed employee with serviceable vision who becomes economically blind with the second accident will be paid most of his compensation from the state's second injury fund.

## CONGRESS ON INDUSTRIAL HEALTH

Two sessions of the 17th Annual Congress on Industrial Health, to be held at the Biltmore Hotel, Los Angeles, February 4-6, 1957, will be devoted to vision in industry.

Presented in cooperation with the National Society for the Prevention of Blindness, they are scheduled for Monday afternoon, February 4, with Dr. Franklin M. Foote, NSPB executive director, as chairman; and Tuesday morning, February 5, with Dr. Edmund B. Spaeth of Philadelphia as chairman. The discussions will deal with components of a complete vision program, evaluation of screening methods, testing for color perception, eye protection, treatment of injuries and other related subjects.

Physicians scheduled for the program include Michael J. Hogan, San Francisco; E. J. Schowalter, Chicago; Ralph Ryan, Morgantown, West Virginia. Other speakers will be Dean Farnsworth, New London, Conn.; Margaret Hargreaves, R.N., New York; James E. O'Neil, New York; Richard Wilkins, Los Angeles, and H. Richard Blackwell, Ann Arbor, Mich.

The sessions and exhibits are open to anyone interested in industrial health and there is no registration fee.

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#### VISION CONSERVATION CHIEF

Thomas M. Colasuonno, Ph.D., has been appointed vision conservation administrator of the Oregon State Board of Health. He succeeds Dr. Eleanor B. Gutman who served from 1951 to September 1, 1956. For some years Dr. Colasuonno has been connected with the school systems of various Oregon cities and of late with Portland State College.



JUDGE NED H. SMITH

The untimely death of Judge Ned H. Smith in Detroit on September 22 was a shock to his countless friends and associates who have long been inspired by his personal courage and his extraordinary capabilities.

Though his vision was badly impaired from infancy, and he became totally blind while a student in high school, Judge Smith nevertheless graduated from Michigan Law School and became an assistant prosecutor assigned to trial work. From 1935 to the time of his death he was on the Common Pleas bench.

Judge Smith made a unique contribution to the field of sight conservation in helping to organize the Detroit Society for the Prevention of Blindness some 10 years ago. Later as a member of the Michigan State Committee of the National Society he gave invaluable service. Because of his important

position in Detroit he was able to exert enormous influence in relation to all efforts to eliminate blindness.

In an editorial following Judge Smith's death the *Detroit Free Press* paid eloquent tribute to him as "one of the most remarkable men ever to come to Detroit. . . . His zest for living was high. He lived a life fuller than many a man with eyesight. All this required a personal philosophy in which blindness in no way set him apart from others."

Judge Smith will be missed from the annual conferences of the National Society which he attended regularly. He will be long remembered as one who successfully met one of life's greatest challenges and who never ceased fighting in a great cause.

#### DANGER LABELS

A list of dangerous substances which should be labeled uniformly in every country was drawn up by a group of experts recently called together by the International Labor Organization in its Geneva headquarters. The ILO has already adopted five danger symbols for five types of hazard: fire, explosion, poison, corrosion and dangerous radiation, and recommends that the appropriate symbol be used on about 160 substances in common use to warn workers in their production, transport, handling and use. Insecticides, nicotine, hydrocarbons, various chemicals and radioactive substances are on the dangerous list.

#### EYE DEFECTS IN HIGH SCHOOLS

Of 3,516 pupils in the Cathedral High School and its branches in New York City 35 per cent showed visual defects during the 1955 annual screening with the Massachusetts Vision Test. The passing limit of visual acuity was 20/40 or worse in either eye. Only two per cent of those referred for follow-up failed to have correction made.

## Recommended Basic Course for Preparation of Teachers of Partially Seeing Children

A MEETING of the National Society's advisory Committee on Education of Partially Seeing Children was held in New York City December 13, 1955. Members present:

Mrs. Dorothy Bryan, assistant director of special education, blind and partially seeing, Illinois State Department of Public Instruction, *acting chairman*; Mrs. Claire Burrell, former acting director, bureau for education of visually handicapped, Board of Education of the City of New York; Dr. Lloyd M. Dunn, coordinator of special education, George Peabody College for Teachers, Nashville, Tennessee; Miss Evelyn M. Eisnaugle, supervisor, partially sighted and orthopedic, division of special education, Ohio State Department of Education (representing Mrs. Hazel C. McIntire); Dr. Gabriel Farrell, Rochester, Massachusetts; Miss Margaret F. Gnadé, supervisor, prevention of blindness department, Pittsburgh Branch, Pennsylvania Association for the Blind; Dr. Romaine P. Mackie, chief, exceptional children and youth, U. S. Department of Health, Education, and Welfare; and Mrs. Nola H. Zaiser, teacher of partially seeing children, Baltimore, Maryland. Absent: Mrs. Hazel C. McIntire and Charles C. Wilson, M.D.

### Invited guests:

Mrs. Amie L. Dennison, teacher of partially seeing children, Nashville, Tennessee (representing Dr. William M. Cruickshank of Syracuse University); Dr. John J. Lee, chairman, department of special education and

vocational rehabilitation, Wayne University, Detroit, Michigan; and Dr. Rose E. Parker, director of special education, Illinois State Normal University, Normal, Illinois.

There follows an excerpt from the minutes concerning recommendations of the types of courses needed for the preparation of teachers of partially seeing children:

Teachers of partially seeing children should receive training, including practice teaching and observation, that will enable them to work in any one of the three plans (traditional cooperative special class, regular class or resource room plan, and itinerant teacher plan). The basic information is the same for each plan. It was agreed that it is advantageous for teachers of the partially seeing, in addition to a general undergraduate curriculum in education and to teaching experience, to have had preparation in the broad area of the exceptional child, courses in personal health, community health organization, school health programs, social and emotional impact of various kinds of physical handicaps, rehabilitation and vocational guidance.

It was felt that the outline of the recommended basic course of at least 120 clock hours should be expanded to include the following topics:

A. At least 30 clock hours of lectures and discussion in organization and administration of facilities for educating partially seeing children, including:

1. Definition of a partially seeing child; common differences among partially seeing children

2. Finding the partially seeing child:
    - a. vision screening methods, evaluation of their relative merits
    - b. relationship to school health programs
    - c. referral and follow-up program
  3. Desirable ways of educating the partially seeing:
    - a. cooperative special class placement
    - b. regular grade placement
    - c. itinerant teacher plan
  4. Legislative provisions in various states
  5. Responsibilities of state and local boards of education
  6. Ways of imparting information concerning need for educational facilities to parents, physicians, community, regular grade teachers, school administrators
  7. Use of community resources, relationships with official and voluntary agencies, individuals, service clubs
  8. Use of state and national resources
  9. Recommended physical environment with special emphasis on principles of illumination and optimum seeing conditions
- B. At least 30 clock hours of lectures and discussion on procedures of conducting the work in elementary, junior and senior high schools, including:
1. Evaluation of child from psychological, medical and social reports
  2. Use of cumulative records—social, achievement and diagnostic tests
  3. Use of educational media and visual aids
  4. Child adjustment:
    - a. atmosphere conducive to good mental and physical health
    - b. social and emotional problems
    - c. child's attitude toward handicap
  - d. teaching of eye hygiene, including proper use of physical environment, educational tools and visual aids
  - e. preparation for the future: counseling concerning social and vocational problems.
5. Program planning for participation with normally seeing children
- C. At least 30 clock hours of observation and practice teaching in a well conducted demonstration school that includes partially seeing children in the three situations described under A-3.
- D. At least 30 clock hours of lectures and discussion on anatomy, physiology and hygiene of the eye, principles of physiological optics, refractive errors and common eye diseases; observation of cases demonstrated in clinics in order to understand eye conditions resulting in loss of vision.

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#### ST. LOUIS AGENCIES MERGE

Two agencies for the blind in St. Louis, Missouri, merged their programs last July—the Lighthouse for the Blind and the St. Louis Society for the Blind.

Mrs. Lee Johnston, formerly chief of the bureau for the blind of the Division of Welfare, State of Missouri, is executive director.

Plans are in the making for an expansion of services to the blind people of St. Louis and St. Louis County and a prevocational training unit will be added to the Light-house. The work of the St. Louis Society for the Blind will be carried on and expanded under the direction of Arch Turner, who will join the staff as director of prevention of blindness on December 1.

## ADVANCED WORKSHOP AT SYRACUSE UNIVERSITY

An advanced workshop for teachers and supervisors of partially seeing children was held at Syracuse University August 13-24, 1956. Among the 16 students in attendance were:

Thelma Biddle, assistant supervisor of sight-saving classes, State of Virginia; Mrs. Joyce Bromley, sight conservationist, Division of Instruction, Knoxville, Tennessee; Ruth Giblin, teacher of high school partially seeing, Boston Public Schools; Mrs. Minnie Lee Powell, sight-saving consultant, Hillsborough County Public Schools, Tampa, Florida; and Elizabeth Yonge, itinerant teacher of partially seeing, Escambia County, Pensacola, Florida.

The students also included the following instructors of the partially seeing: Mrs. Amie L. Dennison, Nashville, Tennessee; Elizabeth A. Hughes, Illinois State Normal University, Normal; Mrs. Gwendolyn J. Lawrence, Roanoke, Virginia; Mrs. Marion Lee, Asheville, North Carolina; Mildred R. Moon, Gary, Indiana; Arline Morin, Waukegan, Illinois; Mrs. Viola Muenchow, Milwaukee, Wisconsin; Mary Reinarts, East Chicago, Illinois; Clarice Wollan, Minneapolis, Minnesota; Edna Woodward, Cincinnati, Ohio; and Laura L. Zemple, Milwaukee, Wisconsin.

Among the lecturers in the course were: William M. Cruickshank, Ph.D., dean of the summer session and director of education of exceptional children, Syracuse University; Arthur Eastman, advanced laboratory, General Electric Company, Nela Park, Cleveland; Evelyn Eisnaugle, supervisor, partially sighted and orthopedic, division of special education, Ohio

State Department of Education, Columbus; Gerald Fonda, M.D., assistant clinical professor of ophthalmology, New York University; Helen Gibbons, consultant in education, National Society for the Prevention of Blindness; James E. Lebensohn, M.D., associate professor of ophthalmology, Northwestern University, Chicago; Mrs. Hazel C. McIntire, director of special education, Ohio State Department of Education, Columbus; John C. Nebo, consultant, Illinois Department of Public Instruction, Springfield; Horace L. Weston, M.D., ophthalmological consultant to the Detroit City Department of Education and instructor in ophthalmology, Wayne University School of Medicine, Detroit; Grace White, professor of medical social work, State University of New York School of Medicine, Syracuse.

Codirectors of the workshop were Mrs. Dorothy Bryan, assistant director of education of exceptional children, blind and partially seeing, Illinois State Department of Public Instruction, Springfield; and Franklin M. Foote, M.D., executive director of the National Society.

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### SMOG SURVEY

A survey to discover what pollutants are related to eye irritation during a smog is being made by the Air Pollution Foundation in the Los Angeles Basin, says *Safety Maintenance* for October. Twenty-six panels of volunteers working in the area will keep a daily score of eye discomfort, and this will be checked against the air samples taken by the 16 sampling stations scattered over the area. Concentrations of oxidant, nitrogen dioxide, sulfur dioxide and other known contaminants will be compared with the averaged degree of eye irritation reported by the panel members.

## 1957 SUMMER COURSES

According to information received so far by the National Society, at least three colleges will be offering summer courses for the preparation of teachers of partially seeing children in 1957. Detailed information about the courses can be obtained by writing the course directors. The National Society's Committee on Education of Partially Seeing Children has recently called attention to the great need for properly prepared teachers in this field.

Illinois State Normal University, dates not yet specified, Dr. Rose E. Parker, director, division of special education, Illinois State Normal University, Normal.

San Francisco State College, June 24-August 3, Dr. Leo F. Cain, dean of summer sessions, San Francisco State College, 1600 Holloway Avenue, San Francisco 27, California.

Syracuse University, July 1-August 9, Dr. William M. Cruickshank, director, education of exceptional children, School of Education, Syracuse University, Syracuse 10, New York.

## WORKSHOP ON VISION SCREENING

A workshop on vision screening will be held January 14-18, 1957, at the Southern Hotel in Columbus, Ohio, sponsored jointly by the Ohio Department of Health and the National Society for the Prevention of Blindness. The objective is to provide an opportunity for exchange of information and ideas concerning vision programs in various parts of the country. There will be keynote speakers on many of the subjects scheduled as well as ample time for small group discussions.

William A. Grimm, chief of the Ohio Department of Health Hearing & Vision Conservation Unit, and four of the unit's regional consultants, will participate in the workshop. Representing the National Society will be Dr. Franklin M. Foote, its executive director, and Mrs. Florence

Cunningham, nurse consultant, both of whom will be present for the entire week.

State health officers have been invited to send their staff members to the workshop, and prevention of blindness workers also are invited to participate.

## AWARD OF MIGEL MEDAL

The Migel Medal, an award of the American Foundation for the Blind, was presented this year to Mrs. Aida de Acosta Breckinridge and to General Melvin J. Maas. In a ceremony on October 18 at the Foundation's headquarters in New York Helen Keller, counselor of the organization, presented the awards for outstanding service in the field of blindness.

Mrs. Breckinridge was cited for her work as organizer and executive director of The Eye-Bank for Sight Restoration in New York, and for her part in founding the Wilmer Institute at Johns Hopkins University for the study of ophthalmology.

In accepting the medal Mrs. Breckinridge said she regarded it as an acknowledgment not of her personal accomplishments, but as a symbol of the beauty and glory of helping others.

General Maas, who is chairman of the President's Committee on Employment of the Physically Handicapped, minimized his disability of blindness. He emphasized the hope and inspiration he had received from thousands of other physically handicapped men and women who have found success and happiness in various fields of work.

## TOXOPLASMOSIS STUDY

A three-year federal grant to the Minnesota Department of Health medical laboratories will finance a basic study of the little-known disease of toxoplasmosis. The research will concentrate on the biology of the organism, and evaluate the dye test now used in diagnosis. Testing of about 1,000 persons may provide clues on how this disease is transmitted.

## NOTES AND COMMENT

### • Training Grants

The Public Health Service's National Institute of Neurological Diseases and Blindness has announced that funds are being made available to medical schools to strengthen existing clinical programs in advanced training in ophthalmology. The purpose is to stimulate the interest of more physicians and scientists in careers as teachers and investigators in this field.

Various studies have shown that one of the obstacles to advancing research in the blinding eye diseases is the lack of a sufficient number of interested and adequately trained young men and women to assist with the conduct of research and teaching. It is hoped that departments of ophthalmology will take advantage of the increased availability of funds for training programs so that they will be in a position to expand fundamental research in the blinding eye diseases.

Training grants also are available to basic science departments to expand postdoctoral training programs in the neurological sciences and the eye.

Further information, together with application forms, may be obtained from the Chief, Extramural Programs, National Institute of Neurological Diseases and Blindness, National Institutes of Health, Bethesda 14, Maryland.

A wide range of eye diseases are being investigated by research teams all over the country under federal grants for the fiscal year 1956 to the National Institute. The eye research program includes 110 projects, for which a sum of \$1,461,500 has been assigned. The chief diseases being

studied are glaucoma, cataract, retinopathy, retrolental fibroplasia, inflammatory diseases and strabismus. Ocular toxoplasmosis and diabetic retinopathy will be investigated in several institutions.

### • Mail-Order Glasses

Several Illinois firms claiming miraculous qualities for eye-glasses sold through the mail incurred action by the Federal Trade Commission during the summer of 1956. In June a complaint was issued against the Invisible Lens Service of Chicago, citing spurious claims made for its contact lenses, advertised as unbreakable, needing no change, and "highly beneficial in cases of squints," among other wholly fanciful qualities. A hearing was set for this case.

In August a cease and desist order was issued against the C. G. Optical Company of Chicago, which for some years had been selling glasses ordered by persons who had "tested" their eyes with a "home eye tester" lent by the company. Like the Advance Spectacle Company of Chicago against which similar action was taken last year, this firm encouraged volunteer salesmen to make a small commission by "testing" their friends for glasses and sending in orders.

The Precision Optical Laboratories in Rochelle, Illinois signed a stipulation in July that they would cease and desist from false claims for their lenses as capable of correcting defects and as "a new invention" and "amazing." They also agreed to drop "Laboratories" from their trade name.

The Commission bans the advertising of spectacles as capable of correct-

ing defects "unless expressly limited to those persons approximately forty years of age and older who do not have astigmatism or diseases of the eye and who require only simple magnifying lenses."

Evidently simple magnifying lenses are all that these firms have to offer—in many cases to people in desperate need of professional advice.

#### • **Physicians and RLF**

Praise for the manner in which the medical profession dealt with the problem of retrolental fibroplasia was expressed by Leslie Corsa, Jr., M.D. in a paper read in the Symposium on Progress in Preventive Medicine held in Los Angeles early in 1956. Dr. Corsa, who heads the bureau of maternal and child health of the California State Department of Public Health, made the following comment:

"It has been hard to escape reading or hearing during the past year that a national cooperative study convicted oxygen in prolonged high concentration as a major culprit in the etiology of this disease, the principal cause of blindness in young children. Here is a good example of unintentional chemical poisoning resulting from the faulty hypothesis that, if a little is good, a lot is better. It is, also, a fine example of the savings in time and in morbidity that result from pooling research efforts of this kind in order to obtain a large enough sample from which to draw valid conclusions. Unlike its recent counterpart relating to a well-known paralytic disease, the results of this study were first widely published and disseminated to the medical profession, who then made their own individual and group recommendations regarding the extent to

which excessive oxygen in incubators for premature infants would be controlled."

#### • **Father Schwitalla Honored**

A portrait of the Rev. Alphonse M. Schwitalla, S.J. was recently hung in the south wing of the St. Louis University School of Medicine, of which he is dean emeritus. Father Schwitalla was dean of the school from 1927 until 1948. In that year he was awarded the Citation to Distinguished Layman of the American Medical Association "for outstanding effort for the public welfare on the national level." He was the first layman to receive the citation. Since 1929 Father Schwitalla has been a director of the National Society for the Prevention of Blindness.

#### • **Campaign Alerts Thousands**

The facts of eye care were again emphasized to millions of Americans during the National Society's 1956 September Sight-Saving Month campaign. The slogan was "A Word to the Wise—Take Care of Your Eyes!"

Approved again by the Advertising Council of America, this campaign enlisted the services of the nation's press, radio and television to tell the public of the vital need for basic eye research. Free educational material was widely distributed as governors of many states officially proclaimed Sight-Saving Month.

Local groups throughout the country joined in the campaign, and television and radio stations in every state gave air time to messages stressing the importance of eye care. Sight-saving features were also given wide circulation by national, trade and company magazines. The transportation systems of major cities used Sight-Saving Month car cards, and many leading

airlines and railroads displayed Sight-Saving Month "notices" on dining car menus and timetables.

As a result of cooperation from the nation's mass media, the New York headquarters of the National Society for the Prevention of Blindness is receiving thousands of requests from men and women in every state for information about eye problems.

Radio-TV chairman for the 1956 campaign was Douglas Edwards, award-winning news commentator for the Columbia Broadcasting System.

#### • Delta Gamma Fellowships

Continuing a policy initiated in 1948, Delta Gamma Fraternity this year granted five scholarships totaling \$750 to candidates for orthoptic training. This woman's fraternity, which works closely with the National Society, also aided 10 teachers to prepare for specialized work with the partially seeing. These grants totaled \$1,500.

Since 1948 under this program assistance has been given to 98 candidates for orthoptic training, teachers of the partially seeing and of the preschool blind. The awards are made with the guidance of a professional advisory committee to whom all applications are referred. Mrs. Virginia Smith Boyce, NSPB assistant director, serves as chairman of this committee.

Delta Gamma conducts vision screening programs for preschool and school children in many cities. Several new groups of volunteers were given special training in vision testing last year by the Society's nurse consultant. Four teams of testers in Westchester County are now working in connection with the county Well Child Clinics. The Oklahoma City alumnae have launched an ambitious program to

test preschool children, and plan to organize a parent training group and an orthoptic clinic. Similar programs are under way in other cities.

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#### 10,000th Wise Owl Honored by the President

Romualdo Gallo is a 22-year-old mechanic's helper at the Newell, Pa., works of General Chemical Division, Allied Chemical and Dye Corporation. Recently, following an accident in which his sight was saved by his protective goggles, Gallo was enrolled as the 10,000th member of the Wise Owl Club of America, the organization sponsored by the National Society.

On September 14 at Harrisburg, Pa., Governor George M. Leader welcomed Gallo as the 10,000th Wise Owl and presented him with a special membership certificate. A short time later Gallo was surprised and delighted to receive the following letter from the White House:

Mr. Romualdo Gallo  
Mechanic's Helper  
General Chemical Division  
Allied Chemical and Dye Corporation  
Newell, Pennsylvania

Through the National Society for the Prevention of Blindness I have learned you are the ten thousandth life member of the Wise Owl Club of America. Congratulations on your membership in this Club and on your wisdom in the use of eye-safety equipment.

Safety glasses supplied by your company are widely endorsed by both labor and management and they demonstrate the rich dividends that safety pays in the prevention of unnecessary suffering.

Best wishes for many more safe and satisfying work days.

DWIGHT D. EISENHOWER

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The Sight-Saving Review

## **Joint Conference of NSPB and Pan American Association of Ophthalmology**

The next Annual Conference of the National Society for the Prevention of Blindness will be a joint meeting with the Pan American Association of Ophthalmology, and will be held at the Hotel Statler, New York City, April 7-10, 1957.

Mayor Robert F. Wagner has sent a personal invitation to Latin American ophthalmologists to visit New York and has agreed to serve as honorary president of the Congress. He will deliver a welcoming address at the opening session, a luncheon at the Statler on Sunday, April 7. Other speakers at the opening session will include Dr. Frank B. Berry, assistant secretary of defense for medical affairs, Washington, D. C.; Major General Dan C. Ogle, surgeon general of the U. S. Air Force; Mason H. Bigelow, president of the National Society; Dr. Brittain F. Payne of New York, president of the Pan American Association of Ophthalmology; Dr. William L. Benedict, of Rochester, Minnesota, executive secretary-treasurer of the American Academy of Ophthalmology and Otolaryngology, and Dr. Moacyr E. Alvaro of Sao Paulo, Brazil, executive director of the Pan American Association.

The scientific program of the Pan American Congress includes three symposia on official themes, with moderators as follows:

Monday morning, April 8. Diseases of the ocular fundus. Dr. George N. Wise, New York

Tuesday morning, April 9. Ophthalmic surgery. Dr. John H. Dunnington, New York

Wednesday morning, April 10. Therapeutics in present-day ophthalmology. Dr. Irving H. Leopold, Philadelphia

Dr. John M. McLean, New York, is arranging the program of papers; Dr. Wendell L. Hughes, Hempstead, motion pictures; Dr. J. Gordon Cole, surgical clinics; and Dr. Gerald Fonda, Short Hills, N. J., scientific exhibits. Dr. Girolamo Bonaccolto, New York, is chairman of the committee on registration and housing, and Dr. Elizabeth Constantine, New York, of the committee on social activities.

The eye specialists will hold sessions in the morning. The National Society will present its programs in the afternoon under the following general subjects:

Monday, April 8. Building a Community Program for Prevention of Blindness

Tuesday, April 9. Children's Eye Problems

Wednesday, April 10. Glaucoma Detection Programs

Registration will start Sunday, April 7, at 9 A.M. Hotel reservations should be made directly with the Hotel Statler, New York.

### **ANCIENT OCULISTS' SEALS**

To protect the public from injurious eye salves a law in ancient Rome required ophthalmologists to use a personal seal on their prescriptions showing their names and special symbols, according to *The Optician* (London) for August 3, 1956. These ophthalmic ointments were based on zinc and calamine. Some of the seals recently found in North Italy were evidently copied from Egyptian scarab designs. By medieval times oculists of noble families used their armorial insignia to identify prescriptions.

## AROUND THE WORLD

### AUSTRALIA

**Gift for Research.** An anonymous donor has presented the Ophthalmic Research Institute with £100,000 for investigations of the cause and prevention of blindness, according to *The Optician* (London) for September 7, 1956. Dr. A. S. Anderson, chairman of the Institute, said that this gift would be used for research into eye diseases, especially glaucoma, which causes nearly a fifth of the eye troubles in Australia.

### GREAT BRITAIN

**"Treatment" for RLF.** Parents of babies blinded by retrolental fibroplasia are being victimized by a doctor who claims to have a cure for the disease, the Minister of Health recently told the House of Commons. He appeared in the House to answer a question by a member as to why treatment for RLF was not available through the National Health Service. The minister said he had investigated this doctor, who was not in the Service, and who charged 500 pounds for treating an incurable disease. Any improvement noted in babies under his care could be explained by the spontaneous cure of some light cases, or by the fact that some infants with RLF have light perception and naturally as they develop may appear to notice more of what goes on around them.

**Shipyard Epidemic.** A widespread outbreak of keratoconjunctivitis which began in November 1955 has disabled many workers in heavy industries on Clydeside. According to the *British Medical Journal* the virus of this "shipyard" type of eye infection has

not yet been isolated, but complement fixation tests indicate that it belongs to the adenoidal-pharyngeal-conjunctival group.

### INDIA

**Trachoma Pilot Project.** As a first step to attacking the trachoma evil throughout India the Government has joined forces with the World Health Organization in a two-year preliminary project. During the first year experts will study the rural population of 20,000 near Aligarh to determine the incidence of trachoma and factors in its spread.

School programs and mass treatment are features of the project, which will be based in the Gandhi Eye Hospital and the newly opened Muslim University Institute of Ophthalmology at Aligarh. WHO is sending Dr. M. Radovanovic as its medical consultant, and Dr. Mohan Lal will represent the Indian Council of Medical Research, which will be in direct control of the pilot study.

### SCANDINAVIA

**Factory Workers Screened.** Of three thousand industrial employees given eye examinations in Denmark and Sweden about one in ten proved to have effective vision in only one eye, according to a report quoted in the *American Journal of Public Health* for July, 1956. This defect had not been suspected by the workers themselves. The examining physicians found that on the average 60 per cent of the workers in an ordinary plant or office needed glasses; that less than two-thirds of these were wearing glasses; and that only one-third of the glasses

were right for the job. Visual defects were rarely recognized as the cause of fatigue and headache. Eye examinations and better lighting for industrial workers were urged in the oculists' report.

**Eye Accidents.** Stockholm children had 276 accidents involving eyes over a five-year period, according to a report by Dr. H. E. Strömborg quoted in the *A.M.A. Journal of Diseases of Children* for April 1956. Most of the mishaps concerned boys aged 7 to 11 years, and more than a fourth of the children admitted to hospital had perforating injuries from arrows and other projectiles. In 18 cases enucleation was necessary.

#### ISRAEL

**Eye Services Abundant.** Israel is well served by about 100 ophthalmologists, most of them trained abroad, says I. C. Michaelson in a report published in the *Survey of Ophthalmology* for October 1956. Even refraction and glasses prescription may legally be done only by registered medical practitioners.

A network of ophthalmic dispensaries is maintained by the Central Sick Fund, to which more than 70 per cent of the population belongs, and there are glaucoma units in several of the larger cities. Eye surgery is performed in six hospital centers, located in Jerusalem, Haifa and Tel-Aviv.

Although the citizens born in Eastern countries brought in a high incidence of trachoma, the seasonal conjunctivitis associated with this disease has been greatly reduced. The Koch-Weeks type is decreasing, and the gonococcal type, a leading cause of blindness in Egypt, does not exist in Israel.

In 1951 the Hebrew University in Jerusalem began undergraduate teaching in ophthalmology, with the scholar Aryeh Feigenbaum holding the first Chair. The ophthalmic department has a research laboratory. Considerable research is carried on by the ophthalmologists of the country, who faithfully attend the sessions of their Society, founded 25 years ago. The meetings are conducted in Hebrew, but the transactions are reported in English.

#### JAPAN

**Blind Children Surveyed.** The Japanese Association for Ocular Hygiene made a study in 1954 of the causes of blindness among children in 70 schools for the blind. A report by Miss Masano Koyama published in the *Journal D'Ophthalmologie Sociale* of December 1954 says that the 7,032 students in this study represent about 82 per cent of the blind children attending schools. The total number of blind school-age children is 11,500, giving an incidence of 62 per 100,000. The great majority of them attend the public schools, though only a third of the group have some useful vision. There are no educational facilities in Japan for partially seeing children.

From the records of eye examinations made by ophthalmologists it is apparent that the overwhelming cause of blindness is congenital disease or anomaly, responsible for 57 per cent of blindness among children.

The ophthalmologist Dr. R. Kawakami stressed inbreeding as a factor in congenital disease. The average ratio of consanguineous marriages in Japan is 5 per cent, but 11 per cent of the total 7,032 students in the survey were born of such marriages.

## CURRENT ARTICLES

**Incidence of Retrolental Fibroplasia: Past and Present.** T. M. Shapira, S. M. Schall, H. Feinhandler and D. Kane. *The Journal of Pediatrics*, Vol. 48, p. 640. May 1956.

A comparative study was made of infants nursed in the Premature Station of the Michael Reese Hospital, Chicago. Group A, studied retrospectively, consisted of 415 babies weighing 1,250 grams or less at birth, admitted from 1922 to 1951. Group B, with 432 infants, weighing up to 2,140 grams, was a controlled study covering the two years up to November 1953. Both groups were given oxygen of about 40 per cent concentration for their first 12 hours of life, and when considered necessary, for longer periods.

Group A had 22 cases of blindness from retrolental fibroplasia, an incidence of 5.3 per cent. The 78 infants in Group B of the same birth weight, 1,250 grams or less, developed blindness in four cases, an incidence of 5.1 per cent.

In the controlled study infants with birth weights between 1,251 and 1,500 grams had almost the same incidence of blindness. Over 1,500 grams the incidence dropped to less than 1 per cent. In the whole Group B there were 35 babies who developed RLF; 11 progressed to blindness, and 24 regressed.

**The Prevention of Retrolental Fibroplasia.** J. C. Locke. *Postgraduate Medicine*, Vol. 19, p. 417. May 1956.

The complete prevention of RLF is an entirely credible goal. Its presumed occurrence in infants who have never received oxygen may be based on a diagnosis mistaking leukocoria for

RLF. The recent survey in the United Kingdom showed that of 344 premature babies only those receiving oxygen developed the disease, and the controlled study by 18 hospitals in the United States gave similar results. In the author's series of more than 500 small premature babies in the Royal Victoria Hospital, Montreal, not even the earliest signs of RLF appeared in any infant except those receiving oxygen for a period of at least three days.

The experience gained in this study, and in a current one in which 72 consecutive premature babies have been nursed under strict oxygen control with no sign of RLF, has shown that at least seven rules should be followed faithfully. These are presented in detail. Besides the necessity for low, measured administration of oxygen for cyanosis only (not for dyspnea), the author notes that oxygen up to 40 per cent may be given during the first day of life without danger of RLF, that no weaning period is necessary, and that oxygen has no therapeutic value in treating cases of RLF. Apparent cures are probably due not to oxygen but to regression.

**Relationship of Retrolental Fibroplasia to Oxygen Concentration.** D. H. Weintraub and A. Tabankin. *Journal of Pediatrics*, Vol. 49, p. 75. July 1956.

During the year ending July 1, 1953 a study was made of retrolental fibroplasia in premature infants at the Children's Hospital in Buffalo, New York. Of the 49 babies given a 60 to 64 per cent concentration of oxygen for

30 days and then abruptly removed, 22 developed RLF. The final examinations made six to ten months after birth revealed that eight babies were blind and nine had severe visual disability (cicatrical stage IV of the NSPB classification).

The 34 babies given 30 per cent oxygen suffered no permanent eye damage. One infant developed partial retinal detachment which later reattached. Following the controlled study the premature center has given premature babies only low oxygen and this only for distress, and up to 1955 no RLF has appeared except for one light reversible case. Mortality under low oxygen has not increased, and in fact has decreased among babies weighing less than 1,500 grams at birth.

**Developmental Eye Disorders in Children.** M. L. Berliner. *International Record of Medicine & General Practice Clinics*, Vol. 169, p. 345. June 1956.

With today's improved methods ophthalmologists can give a thorough examination to very young children, and they should insist that this be done. Many defects are not noted until a child enters school, by which time some of them are beyond remedy.

Besides the gross congenital defects, such as microphthalmus, there are anomalies connected with disturbed metabolism for which the specialist should be on the alert. Children of a consanguineous marriage need a careful examination since nystagmus, strabismus, coloboma and many other defects may be present in varying degrees of development. Early surgery for congenital cataract and glaucoma is often indicated.

While retroental fibroplasia is hap-

pily becoming a thing of the past, the newly recognized entity, toxoplasmosis, is to be reckoned with. As for strabismus, the pediatrician who assures parents that the child will outgrow this defect is remiss, since neglect may lead to amblyopia of the deviating eye. The pediatrician is warned about the dangers of retinoblastoma, which requires early enucleation in the hope of saving the unaffected eye.

**Statistics on Strabismus in the Amsterdam Youth: Researches into the Origin of Strabismus.** R. A. Crone and C. M. J. Velzeboer. *A.M.A. Archives of Ophthalmology*, Vol. 55, p. 455. April 1956.

In a study of 914 children with strabismus strong evidence was found that the convergent type at least was the result of a single clinical entity. The unexpected and remarkable finding of the investigation was that all types and characteristics of convergent squint are hereditary to an almost equal extent. This makes it extremely improbable that factors such as hyperopia, fusion failure or anatomical anomalies are more than triggers setting off the one inherited predisposition.

The children studied ranged in age from infancy to 12 years, and 94 per cent of them had convergent squint. In 20 per cent the strabismus was temporary, in 28 per cent alternating. Most of the group, 724 children, had developed squint by the age of four years, and this group presented a completely different clinical picture from those in whom squint appeared after the age of four. The early group was typically emmetropic with alternating squint, nystagmus and alternating

hyperphoria; the late group had normal correspondence, severe hyperopia, and a squint in one eye when looking without the aid of glasses.

Sixty-three per cent of the children belonged to families with other cases of squint. The percentage of hereditary predisposition was noted for each characteristic, refractive, orthoptic, etc. and the whole list ran amazingly close to this general percentage of 63; all types of squint had about the same degree of hereditary predisposition. In the general population the mean incidence of squint is about 3 per cent, but 13 per cent of the parents of the children studied were also squinters.

Amblyopia was found in half the untreated cases and in 23 per cent of those adequately treated, which indicates that many children with strabismus can avoid amblyopia with adequate care. A much higher proportion could be cured with optimal treatment.

Birth trauma could be disregarded as a possible cause of squint except that it appeared in the histories of 22 per cent of the children developing strabismus early, and in only 5 per cent of the late-squint group. Probably birth trauma precipitates the appearance of squint in children already predisposed, acting as a trigger factor. The same role is assigned by the authors to precipitating diseases, chiefly measles, and to hyperopia and myopia. There were 184 cases of the former and 56 of myopia, which had a conspicuously higher percentage (30) in the divergent type as against 5 per cent in the convergent type. About 100 cases of anisotropia were found. Suppression was found in half the squinters and abnormal retinal correspondence in 11 per cent.

The conclusion that in all types of

convergent squint one hereditary, pathological mechanism is at work reinforces Worth's theory that strabismus is caused by congenital weakness of binocular vision. This seems like a chicken-and-egg explanation, but it agrees with clinical experience.

**An Evaluation of Methods in School Vision Screening.** C. D. Benton, Jr. *Guildcraft*, Vol. 30, p. 27. June 1956.

The ophthalmologists of Florida have recommended a vision screening test for use in the schools of the state, following a survey made at the request of the state board of health. Three different types of examinations are in current use: the Snellen, Telebinocular and Massachusetts vision tests. After careful evaluation the Florida Society of Ophthalmology and Otolaryngology endorses as the single most important test the illuminated Snellen E chart. The standard visual acuity is set at 20/30 for children in Grades 1 and 2, and 20/20 for higher grades.

Experience shows that the Snellen visual acuity test reveals cases of excessive hyperopia or hyperopic astigmatism, and also finds any significant muscle imbalance. However, tests are recommended for both; the hyperopia test to be given second grade children only, with +2.50 diopter lenses and a 20/30 standard; and the Atlantic City or Massachusetts test for muscle balance, for distance only. The final recommendation is that all Telebinocular tests be discontinued in school vision screening.

In arriving at these decisions the pooled opinions of the Florida ophthalmologists and reports from various parts of the country were taken into account. In the experience of the Florida specialists all the tests tend to

refer too many children; the Snellen over-referrals being estimated at 20 per cent, the Massachusetts test 33, and the Telebinocular 41 per cent. The author also found that there was great disparity in test conditions in Broward County, where the Snellen chart test was given 12,800 children in the first six grades. With a 20/20 standard for all grades there was an average failure rate of 19 per cent. But one school of about 500 students failed about 2 per cent of the children, while another school of the same size reported failures of 42 per cent. In Broward County the author found that 75 per cent of referrals from the Snellen test were justified, plus another 10 per cent needing further observation. Of the children who failed the visual acuity part of the Telebinocular test, 60 per cent needed glasses or other care.

Since hyperopia is normal for a child's eyes, and diminishes after age six, only 42 per cent of the ophthalmologists in the recent poll stated that they believed a hyperopia test important in school surveys. However, the test has been endorsed for second-graders in the Florida schools. If hyperopia is not excessive at age seven, Benton feels that it never will be during the school years.

Only 30 per cent of the Florida ophthalmologists favored a muscle balance test. The Telebinocular muscle balance test is too difficult and critical for school children; only 15 per cent of those failing the test and then examined by the author were found to be abnormal by medical standards. No particular muscle test is as yet recommended for Florida schools, but the suggested ones are the Atlantic City test, the Worth 4-Dots or the Massa-

chussets test with the near phoria omitted.

**A Critical Study of Visual Screening.** V. Ryan. *American Journal of Optometry*, Vol. 33, p. 227. May 1956.

The author, a faculty member of the Pennsylvania State College of Optometry, carefully reviewed the literature on vision screening of school children with particular reference to studies at Columbus, Ohio; St. Louis, Missouri; Danbury, Connecticut; Shrewsbury and Andover, Massachusetts; and Toronto, Canada. Concerning the difference of opinion on the subject of screening children for heterophoria, he points out that such tests measure only demands upon the postural mechanism without taking into account the reserves available to cope with these demands. Ryan feels that heterophoria screening of older children is justified, but suggests that such screening might be omitted for all children in second grade and below.

Among the conclusions are: that the distance Snellen test is undoubtedly the best single test available for vision screening; that the Massachusetts Vision Test is a good screening procedure; and that in school screening programs teacher observation should supplement the test results. Ryan does a great service by calling attention to the problem of "dead end" referrals, mentioning that in one city only one-fifth of the children found in need of eye care as a result of screening tests in the fall had received it by the following August. "A high over-referral rate rapidly brings vision screening programs into disrepute among parents, causing them in many cases to ignore the referral notices."

Ryan warns of the dangers to ophthalmic practitioners and the public when eye doctors, armed with such devices as the ophthalmoscope and the pinhole disk, go to the schools to conduct or supplement the vision screening portion of the school health program.

Some of the dangers are: Parents would rely unduly on the results of passing the screening by an ophthalmic practitioner, and would be less likely to take the child who develops subsequent symptoms for an examination; over-referrals still would result and reflect on the practitioner; the practitioner would be putting himself on the same basis as a technician; the monotony of screening large numbers would make the practitioner lose interest; and the preconceived estimate of the practitioner's status in the school set-up would be very different from the actuality. For these and other reasons ophthalmic practitioners should limit their relationship to serving in an advisory capacity.

In view of the many shortcomings of vision screening, Ryan advocates consideration of the requirement of thorough clinical eye examinations by private or employed practitioners prior to entrance to school and periodically thereafter. Although recognizing the magnitude of such a requirement, he estimates that the present systems of screening, follow-up, dead-end referrals and record keeping are almost as costly.

#### **A Preschool Vision Screening Program.** B. Downing. *Nursing Outlook*, Vol. 4, p. 351. June 1956.

Vision screening of preschool children is important for the detection of refractive errors and more serious con-

ditions such as muscle imbalance, which should be treated before a child is four years old. A community group wishing to set up a screening program may request the assistance of the National Society for the Prevention of Blindness in planning the project and training volunteers who test the children.

It is desirable to have a professional advisory committee which includes representatives of eye care professions, pediatricians, school and public health agencies. This committee helps to decide about criteria for referral so that when the program is under way the volunteers may refer children for a professional examination. Children generally are screened twice before referral, this keeping unnecessary referrals at a minimum. The public health nurses are generally responsible for following up cases which require further help.

(Editor's Note: This article is available as a four-page reprint from N.S.P.B. Pub. No. 185; 5 cents).

#### **An Explanation for the Poor Performance of Aphakic Patients on the Harrington-Flocks Screening Test.** L. L. Sloan. *American Journal of Ophthalmology*, Vol. 41, p. 987. June 1956.

The multiple pattern method of Harrington and Flocks for finding defects of the visual field within a radius of 25 degrees from fixation uses patterns invisible in ordinary light. During exposure to light from an ultraviolet lamp these patterns fluoresce with a greenish color.

Harrington and Flocks tested aphakic patients who had normal visual fields when examined by standard

methods, and reported that these patients responded as if they had a visual field loss. This poor performance was attributed to optical factors associated with the high power of their spectacles.

While optical factors do blur the retinal images and displace them outward from the fixation point, the real explanation of the failure of aphakics to see the targets is the ultraviolet light reflected from the white test cards. Wald has shown that the near ultraviolet between about 300 and 400 millimicrons is absorbed by the lens of the eye. At the 365  $\mu$  level of ultraviolet used in the Harrington-Flocks test the aphakic eye is about a thousand times more sensitive than the normal eye. The ultraviolet reaching the retina would be perceived as blue, making the greenish test patterns almost invisible.

This effect was demonstrated by testing 10 aphakic eyes with and without a filter which blocked the ultraviolet. Without the filter there was only one instance when more than two of the 30 targets were seen; patients missing all the targets reported that they saw only a general flash of bluish light. With the filter the aphakics saw from 9 to 30 of the targets.

**Genetic Prognostication and Counseling in Ophthalmology.** H. F. Falls. *Transactions, American Academy of Ophthalmology and Otolaryngology*, Vol. 60, p. 576. July-August 1956.

The growing need for genetic prognosis has resulted in the establishment of 13 heredity clinics in the United States and Canada. Genetic counseling in ophthalmology is full of pitfalls, since our fund of knowledge remains deficient despite much research.

The ophthalmic counselor should have a thorough knowledge of general genetics, the ability to make an accurate diagnosis, and a familiarity with the literature. He must take a careful pedigree of the family in which the trait is being studied, and examine all available members. His task is complicated by the fact that apparently the same clinical trait may be transmitted differently in different families. For instance, five different modes of inheritance have been reported for retinitis pigmentosa. It is essential to get the history of the pregnancy with the affected patient, since noxious agents such as rubella may produce pathologic changes in the eye of the child which cannot be distinguished from those of genetic origin.

The counselor's task becomes extremely difficult when he encounters a sporadic case with parents and siblings normal for that trait. Here there are four possibilities. The anomaly may result from (1) a mutation in the germplasm of one parent; (2) a noxious intrauterine agent; (3) a double dose of a recessive gene from consanguineous parents; (4) failure of penetrance of the gene, so that it appears to skip a generation.

It is not yet possible to give genetic risk figures for most ocular hereditary entities. However, Mendelian principles apply. Half the children of an affected and a normal parent risk inheriting a dominant trait. All male offspring of a normal male and a carrier female of a sex-linked gene have a 50 per cent risk of being affected. Children of two carrier parents of a recessive gene who are phenotypically normal have one chance in four of being affected.

The transmission of rare ocular

traits for which the hereditary patterns are not as yet well understood is a nebulous matter in which the counselor can only make a guess. Intermediate sex-linked traits suggest the complexities of inheritance. Half the sons of a carrier female risk being affected; half the daughters risk being carriers. The daughters of an affected male are all carriers, but in addition reveal a clinical change. Carriers of retinitis pigmentosa, for instance, show a tapetal reflex; carriers of external ophthalmoplegia show absence of knee jerks.

Diseases and anomalies are listed by mode of inheritance: 98 dominant traits, 58 recessive, 14 sex-linked recessive, and five intermediate sex-linked.

**Tests for Color Deficiency Based on the Pseudoisochromatic Principle.**  
L. L. Sloan and A. Habel. *A.M.A. Archives of Ophthalmology*, Vol. 55, p. 229. February 1956.

Three new tests for color deficiency were investigated: the Dvorine Plates, issued in 1953 and reprinted in 1955; a new undated edition of the Ishihara plates, and the revised American Optical Company test (AO-HRR). These were evaluated against the 20-plate test, a group assembled from four different tests and used at Wilmer Ophthalmological Institute since 1950.

As eventually diagnosed the subjects included 100 males with normal color vision and 176 color-deficient; none of the subjects had ocular disease or abnormality. Deficient color vision was confirmed in each case by the Nagel Anomaloscope, the Color-Threshold Tester, the Farnsworth-Munsell Dichotomous Test, the F-M 100-Hue Test, and others.

The Ishihara, Dvorine and AO-HRR tests all proved effective in detecting the great majority of those with deficient perception for red and green, but each would now and then fail to detect mild degrees of red-green deficiency. More intensive study of such borderline cases is needed. In order to detect them, certain plates of all three tests should be modified to make them more difficult. The AO-HRR test misclassified two of 100 normal subjects as deficient; an error which could be reduced by increasing the number of screening plates and lowering the stringent passing score. The fact that the AO-HRR test also gives information as to the type and degree of defect makes it more generally useful than any other pseudoisochromatic test.

The 20-plate test proved to have the highest diagnostic efficiency, since it was more difficult for all color deficient and for those with mild deficiencies. It could serve as the single criterion in screening for red-green color deficiency.

**H - R - R Pseudo - Isochromatic Plates: As a Diagnostic Aid in Retrobulbar Neuritis of Multiple Sclerosis.** R. D. Steinmetz and T. P. Kearns. *American Journal of Ophthalmology*, Vol. 41, p. 833. May 1956.

The detection of retrobulbar neuritis in a patient suspected of having multiple sclerosis is of great value. The new Hardy-Rand-Rittler pseudoisochromatic test for color blindness provides a sensitive test for visual acuity, and sometimes gives the only objective evidence of past involvement with retrobulbar neuritis.

The acute form is usually manifested by the loss of vision in one eye,

often with spontaneous recovery in one or two months, at which time pallor of the disk may develop, and a relative central or paracentral scotoma may remain as a sequela. The chronic type associated with multiple sclerosis begins with a slight blurring of vision of one or both eyes, which is slowly progressive or in some cases stationary. Disturbed vision may last days or months with partial or complete return to normal. Pallor of the disk may develop tardily, and the presence of a small relative scotoma may be hard to detect. The patient may have 20/20 vision and normal disks and fields of vision, and in these cases the test with the H-R-R plates can provide the sole clue to a past episode of retrobulbar neuritis.

Five case histories are presented, showing the value of this color test in confirming a diagnosis based on other signs, or in indicating a past episode of retrobulbar neuritis, in the absence of residual signs.

#### **When and How to Operate for Retinal Detachment.** H. Arruga.

Paper presented at Fifth Pan-American Congress of Ophthalmology, Santiago de Chile, January 1956. *Archivos Chilenos de Oftalmología*, Vol. 12, August-December 1955.

The author, an ophthalmic surgeon of Barcelona, Spain, draws on long experience in describing 18 different types of retinal detachment and suggesting surgical procedures. Despite the complexities of retinal detachment, one factor is decisive both before and after surgery: the behavior of the choroid. Since this is usually an unknown factor, even the experienced surgeon may find a simple case turning out badly and a serious one recovering.

In recent myopic or senile detachments of slight extent the operation of choice is diathermy with a flat electrode, followed by a puncture to remove the subretinal fluid and, almost invariably, an injection of air into the vitreous. If infections exist surgery should be postponed while the patient is given cortisone or ACTH. Large perforated or degenerated areas in the detached retina call for lamellar scleral resection to shorten the eyeball.

When the lesion is a dialysis in the ora serrata of the lower hemisphere, there may be a remission of months or years, especially in young patients. Not infrequently a patient will complain of lowered visual acuity in one eye, and we find a detachment in the other. These cases are not helped by bedrest nor as a rule by surgery. This should take the form of diathermy in the area where the retina is near the choroid, and is merely to prevent further detachment. There is no need to hurry surgery in these cases, but if the dialysis is in the superior or lateral part of the ora serrata an operation is urgent.

Presurgical study of each case is of the utmost importance. As Gonin said, the best instrument for curing retinal detachment is the ophthalmoscope.

#### **Idiopathic Retinal Detachment.**

A. Hagedoorn and D. H. Sieger. *American Journal of Ophthalmology*, Vol. 41, p. 660. April 1956.

Congenital retinovitreal adhesions may play a role in the pathogenesis of retinal detachments, and explain "idiopathic" cases. Histologic evidence was found in the enucleated eye of a child aged nine months which showed delicate fibrous strands emerging from the retina and entering the vitreous. There

is little doubt as to the ectodermal nature of these anomalies. Normally the work of the ectoderm ends at a very early stage of embryonic development, but in this case the equilibrium between ectoderm and mesoderm had evidently been disturbed, and regression of the ectoderm had been delayed.

A search was made of sections of normal eyes, and an adhesion identical in cell arrangement with the one described was found in the completely normal eye of a man who had died of sprue. Finally a clinical case was encountered which could only be diagnosed as due to a similar congenital adhesion. The patient, a man of 60, complained of the sudden appearance of spots in front of the right eye. The ophthalmoscope showed entirely normal fundi, but for a hole in the retina of the right eye. Since there was no trace of preceding inflammation or degeneration, it was concluded that the piece of retina had been torn out by the force of a congenital adhesion.

Cases of "idiopathic detachment" may occur rarely, but it is possible that retinovitreal adhesions of the congenital type may be involved in other cases of retinal detachment, providing a framework on which flaps and opercula develop.

**Against the Threat of Blindness.**  
P. De Kruif. *Today's Health*, Vol. 34, p. 21. April 1956.

In an article designed for the layman De Kruif explains the mechanics of glaucoma, and describes the dramatic success of Diamox in controlling chronic simple glaucoma. Family doctors are indispensable partners with oculists in long-term treatment with Diamox, for they can do much to relieve the side effects suffered by some

patients. The roles of this drug in acute glaucoma, and in helping ophthalmoscopy and cataract extraction when high intraocular pressure exists, are described.

**Glaucoma Before Surgery.** F. B. Fralick. *Transactions, Pennsylvania Academy of Ophthalmology and Otolaryngology*, 1955. p. 114. Winter, 1955.

The detection and medical management of glaucoma require more patience and mature judgment than does surgery. An early diagnosis is of the utmost importance, for if the case has advanced to field and disk changes it is likely that neither medical nor surgical therapy can arrest further degeneration.

Even when tonometry becomes a routine part of examinations by the general practitioner, a certain proportion of glaucoma cases will escape his detection. Some persons show a normal or near-normal tension in the early stages, but the ophthalmologist realizes that an unstable tension may be as indicative as a high tension. He knows that both types of glaucoma have a hereditary factor. Subacute (narrow angle) glaucoma can sometimes be diagnosed from the patient's history, before examination. The safest tests for this type are the dark room and the paredrine or neosynephrine mydriasis tests, and for chronic simple glaucoma a 24-48-hour diurnal tension study and the water-drinking provocative test.

In managing chronic simple glaucoma, if the tension can be completely controlled by miotics or surgery before optic atrophy and its resulting field changes have set in, there is a chance of arresting the disease. But tono-

graphic measurements, perimetry, and fundus examinations should be made periodically. If for any reason miosis is not adequately maintained, surgery might be advised. But in a case of deterioration, surgery may not help.

Narrow angle glaucoma of the non-congestive type may also be managed by miotics in some cases, but medical management over a long period is not preferable to surgery if there are periodic tension rises. Acute congestive glaucoma must be regarded as an emergency in which the patient should at once be prepared for surgery.

**The Glaucoma Problem.** M.J.Reeh.  
*The Journal-Lancet*, Vol. 76, p. 38.  
February 1956.

The public is in great need of education about glaucoma. Most people think that glasses will cure their eye symptoms, and it rarely occurs to them to suspect ocular disease. The public, the medical profession, and even some ophthalmologists must become glaucoma conscious, and tonometry of all persons over 40 should be accepted as routine in physical examinations.

Chronic simple glaucoma causes marked devastation to the eye with minimum symptoms. This form must often be discovered by the examiner without help from the patient, who has experienced few or no symptoms. Abnormal intraocular pressure on the lamina cribrosa, one of the weakest points of the eyeball, produces cupping of the optic disk and destruction of the optic nerve fibers.

Efforts by the medical profession to find early indications of glaucoma are well rewarded, since 85 per cent of the cases treated early and adequately retain useful vision.

**Tonography in the Clinical Management of Glaucoma.** H. G. Scheie, R. W. Spencer and E. D. Helmick. *Transactions of the American Ophthalmological Society*, Vol. 53, p. 265. March 1956.

A series of 600 tonographic studies in 239 eyes with various types of glaucoma evaluated tonography as a procedure for diagnosis and management of the disease. The authors regard it as a research tool which has already lent brilliant support to gonioscopy and enlarged knowledge of aqueous outflow in both normal and glaucomatous eyes. Its greatest clinical value is in assessing acute congestive glaucoma. Tonography indicates that this disease occurs as the result of angle closure. It helps determine the extent of obstruction to aqueous outflow by peripheral anterior synechias, and is useful in indicating the need for surgery.

Tonography did not prove as reliable as the water provocative test in diagnosing chronic simple glaucoma. In 105 eyes already established as glaucomatous by other clinical findings the water test confirmed the diagnosis in all but four eyes, while tonography indicated glaucoma in only 35 eyes. Tonography was found least conclusive in borderline cases where the disease was mild; in 58 eyes of "glaucoma suspects" the tonographic values were all within the lower limits of normal eyes.

The coefficient of aqueous outflow is probably not a reliable criterion of the success or failure of medical treatment, which is better judged after careful, repeated visual field tests and recordings of ocular tension. Tonography cannot take the place of good clinical judgment and established methods.

**Experimental Studies of the Choroidal Vessels. I. Historical Survey.**

**II. Methods and Materials of Investigation. III. Anatomical Observations.**

E. Wudka and I. H. Leopold. *A.M.A. Archives of Ophthalmology*, Vol. 55, p. 605. May 1956.

The primary object of this study, which was supported by a grant from the National Society for the Prevention of Blindness, was to investigate the larger vessels of the choroid as they appear in the living animal. It has been estimated that half the ocular pathology results from disturbances developing in the choroid, and there is need to increase our present knowledge of the middle ocular coat.

As an introduction the authors sketch concepts and investigations of the choroid from ancient times to the present. They then describe various methods of research: dissection, histological study, injection of the enucleated eye, and techniques used *in vivo*. Direct study in the living animal include ophthalmoscopy, biomicroscopy, and observations through the dehydrated sclera or through scleral windows. Leopold has used both of the last two techniques, and was the first to devise a scleral-window method for studying the choroidal circulation in the rabbit eye.

The present study was made with albino rabbits, whose absence of pigment is an advantage. The animals were anesthetized and placed on a table with special devices for immobilizing the head. After surgical preparation the eyes were studied through a binocular stereoscopic microscope, and photographed. Some areas could not be observed under the conditions of this study, and the authors have supplied details to fill out an integrated

picture of the ocular blood supply and vascular structures.

Clear photographs were obtained of the ciliary arteries, of the slender arterioles situated deep between the veins, and of the anterior and posterior venous circles.

The presence of interarterial and intervenous anastomoses has long been recognized, but there has been disagreement as to whether arteriovenous communication exists in the choroid. In the present study no instance was found of a direct flow of blood from arteries to veins. Descriptions of such a flow have been prompted by an illusory impression of exchange between small caliber vessels.

A comparative study was made of the choroid of the guinea pig, which has the same general pattern as the rabbit. Minor differences in anatomy are described.

**Experimental Studies of the Choroidal Vessels. IV. Pharmacologic Observations.** E. Wudka and I. H. Leopold. *A.M.A. Archives of Ophthalmology*, Vol. 55, p. 857. June 1956.

The innervation of the choroid and the action of drugs on its vessels was investigated in a study supported by the National Society for the Prevention of Blindness. The choroidal circulation was observed in living albino rabbits through the outer ocular coat by techniques previously described. Because of proptosis of the eyes, dehydration of the sclera and insertion of a plastic disk in the suprachoroidal space, a maximal dilatation existed from the beginning of the studies, and experimental conditions may have decreased the sensitivity of the ocular vessels to the drugs administered.

The observed effects of the pharmacologic agents fall into two groups: those agents manifesting a direct action on the vessels, and those affecting the choroidal circulation only when systemic effects were noticed.

In the first group (vasoconstrictors) the drugs tested were epinephrine, arternol, phenylephrine, ephedrine, methoxamine, histamine, vasopressin (pitressin) and croton oil. Two general points may be stressed. First, the dose required to elicit the choroidal vascular response was considerably higher than the dose necessary to cause a similar response in other vessels. This was partly due to the experimental conditions. Second, the more readily constricted area was the intraocular portion of the long posterior ciliary arteries (except with vasopressin, which constricted primarily the choroidal arterioles). Contrary to the opinion of some investigators that the vascular changes are secondary to the effect of these drugs on the ciliary muscle, the present authors believe that the drugs acted directly on the vessel, since the vascular response was rapid and appeared long before any change in pupillary size, and probably in ciliary action. The ciliary muscle is poorly developed in the rabbit.

The appearance of white emboli after trauma and after the administration of epinephrine and arternol is of particular interest. These were soft, pliable white masses which appeared chiefly in the veins. When large clumps were present they might block the venule temporarily, and then change formation and slide along till they reached the larger vessels to be carried away in the circulation.

The effects secondary to systemic manifestations were observed in the

second group of agents (vasodilators). The numerous drugs tested were cholinergic, parasympathomimetic, parasympathetic-blocking, adrenergic- and sympathetic-blocking agents, ganglion-blocking agents and direct vasodilators. In small doses when no systemic effects were observed there was no perceptible change in vessel caliber. Higher doses interfering with the vital functions of the animals induced a pallor of the choroid, a decrease in the speed of flow and sometimes pulsations at the points where the arteries perforate the sclera. Now and then there was a temporary standstill of the circulation, with transitory reversal of flow and passive decrease in vessel caliber.

No effect was observed on the veins that integrate or drain the choroid. The capillaries and terminal vessels could not be seen clearly enough in living animals to shed any light on the behavior of these vessels.

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#### HEALTH RESEARCH GRANT

An appropriation of \$30,000,000 for the construction of new facilities for health research has been made by Congress, and is being administered by the Public Health Service of the Department of Health, Education and Welfare. Grants-in-aid will be given to public and non-profit institutions on the basis of not more than 50 per cent for the federal share.

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#### PUGILIST GOING BLIND

Lightweight pugilist Bobby Woods, the press reports, has been ordered to the hospital for ophthalmic surgery. His meteoric career in the ring has left him at the age of 21 with multiple retinal detachments of the right eye and a traumatic cataract in the left. The prognosis is reported as poor.

## BOOKS AND PAMPHLETS

**THE TRUTH ABOUT EYE EXERCISES.** Philip Pollack. Chilton Company, Philadelphia. 1956. 120 p. \$4.75.

As recently as October 1955, Galton in *Coronet Magazine* erroneously stated: "Dr. William H. Bates threw a bombshell into the ophthalmological world 35 years ago with the publication of 'Perfect Sight Without Glasses.'" Actually, Bates' eye-exercise (or eye-relaxation) theories were held by many in the nineteenth century until scientific observation showed that it was the action of the ciliary muscle inside the eyeball that controlled accommodation to near vision, rather than the action of the extraocular muscles. Yet Bates' followers—Aldous Huxley, the writer of fiction, Corbett and Hackett—continue to tout his concepts.

Pollack outlines Bates' ideas and his ties with Bernarr Macfadden who, in 1917, sold the eye-exercise course for three dollars along with a year's subscription to *Physical Culture*. Gayelord Hauser added to Bates' eye exercises the hopeful suggestion that sight would be aided by the consumption of such products as Hauser Potassium Broth which, by an astounding coincidence, could be obtained only from the Hauser farm.

Pollack carefully explains the scientific evidence that for many years has revealed the mistakes in Bates' theories. A photograph taken with infrared light in 1955 is published, showing proof of the lens changes in accommodation. The dangers of the exercise "sunning"—looking into the sun—are revealed, as well as the effects of neglect of such serious blind-

ing eye diseases as glaucoma and cataract, which Bates' followers claim to treat successfully.

The chapter on "Believing Is Not Seeing" is an able exposition of why faith cures help people, and why simple, unfounded but revolutionary theories about disease seduce the minds of otherwise intelligent persons. One of Bates' disciples openly expressed the nature of the cult: "The work is nine-tenths mental." Several years before publishing his book Bates had written on "Memory As an Aid to Vision." The reason for his interest in memory perhaps was explained by a strange story that was included in his obituary in the *New York Times* in 1931. A few years after starting to practice medicine, Bates vanished and was later found by his first wife in London with no recollection of recent events. She took him to a hotel, but two days later he again disappeared. His wife later died without ever locating him again. After her death he turned up in the Middle West, moved to New York and remarried.

Pollack wisely points out the value of a different type of eye exercise, orthoptic training, recommended by oculists and optometrists as an aid to treating selected cases of strabismus, phorias and failure of the two eyes to function as a team.

Samuel Hopkins Adams said that the only time the average American puts aside his native shrewdness is when he buys not commodities but relief from suffering. Those who have felt the need of a well-documented summary of fallacies of eye-exercise faddists will welcome this book.

**SURGERY OF THE EYE: DISEASES.** Alston Callahan, M.D., F.A.C.S. Charles C. Thomas, Springfield, 1956. 425 p. \$25.00.

With this presentation of the surgical treatment of diseases and congenital anomalies of the eye Dr. Callahan completes the work begun in his *Surgery of the Eye: Injuries* (1950). Material for this large-format, well-organized book was drawn from the author's surgical management of 3,500 patients, and from teaching and directing residents of the Thigpen-Cater Eye Hospital in Birmingham, Alabama, in 4,000 operations. The graphic three-dimensional drawings by Alice E. Arthur which show each stage of an operation are often grouped on a page facing the explanatory text, enabling the surgeon to visualize the material clearly. Color plates, paintings, drawings and photographs everywhere point up the text.

The purely surgical problems of the eye and adnexa are considered in a broad context which includes anesthesia, complications and aftercare, and also the psychological factors in certain conditions. Of particular interest to eye surgeons are the 14 chapters on cataract and glaucoma.

In discussing congenital diseases and anomalies Dr. Callahan warns of various pitfalls. Unless the vision is extremely poor, surgery should in his opinion be avoided because of the risk of later complications, such as glaucoma. In infantile glaucoma which appears after birth no operation can be considered too early. He feels that the prognosis is bad if surgery is delayed for a year or more after the first appearance of symptoms.

The other types of glaucoma, and

the interrelation of glaucoma with a cataractous lens, are fully discussed. Here gonioscopy for study and Diamox for therapy are correlated with different operative techniques.

**ENDOGENOUS UVEITIS.** Alan C. Woods, M.D. Illustrations by Annette Smith Burgess. The Williams & Wilkins Company, Baltimore, 1956. 274 p. \$12.50.

The subject of endogenous uveitis is complicated at best, and great confusion exists in descriptive terminology. Dr. Woods clears away much of the verbal underbrush obscuring what he calls "etiological and diagnostic problems of the most singular complexity." He defines endogenous uveitis as "nonpurulent inflammations of the uveal tract which are related to a systemic disturbance, either an infec-

**THE  
TRUTH  
ABOUT  
EYE EXERCISES**

BY PHILIP POLLACK

"By exposing the fallacies of cultists and faddists in this field, the author has made a genuine contribution."  
*Martin Ackerman, M.D.,  
New York Eye and Ear Infirmary.*

"One of the best debunking jobs conscientiously placed before the public."—*Marietta Journal.*

"Points out the importance of teamwork between educator, eye surgeon and optometrist."  
*Glenn A. Fry, Director, School of Optometry, Ohio State University.*

"New book gives new answers . . . as it carefully analyzes both sides of the coin."—*Parade magazine.*

\$4.75 at all bookstores

Chilton Company Philadelphia

tion or an acute sterile endogenous insult." The last phrase also supplies his definition of the two main groups of the disease, each with its different pathogenesis, clinical course and histologic picture. Nongranulomatous uveitis is an acute and self-limiting inflammation resulting from an allergic insult or more rarely from a toxic or physical insult. The granulomatous type has a prolonged course and is evidently caused by the actual presence of living causative organisms in the ocular lesions.

These agents include microorganisms of various diseases, virus and fungus infections, protozoans, round and flat worms, diptera larvae and the unknown factors in sympathetic ophthalmia and sarcoidosis. Since specific treatment of this blinding disease depends on finding the cause, the ophthalmologist must work as leader of a medical team in which the bacteriologist is an essential member.

Dr. Woods describes the startling changes in the diagnosis of granulomatous uveitis which followed discoveries by ophthalmic pathologists. In 1941 the disease was generally attributed to "conventional causes," and Dr. Woods and his colleagues at the Wilmer Institute set down the percentages for etiology as 79 for tuberculosis, 16 for syphilis, 1 for brucellosis, 1 for sarcoidosis and 3 for viral and other diseases. Then in 1952 Mrs. Helenor C. Wilder (now Mrs. R. C. Foerster) demonstrated toxoplasmosis in eyes enucleated for chorioretinitis, and Dr. Woods's 1953 table showed the result of much earnest work. It was clear that too many cases in the past had been wrongly attributed to tuberculosis, and this was now listed as 23 per cent. Acquired toxoplasmosis was

definitely found for 22 per cent, and the congenital type for 4. A large margin of 18 per cent undetermined cases was felt necessary.

With knowledge of endogenous uveitis in such a rapid state of evolution, it is a tribute to Dr. Woods's immense clinical sagacity and to his clear thinking and writing that the student can follow a sure-footed course through his book. Mrs. Burgess's beautiful paintings are a valuable contribution. Since this disease is estimated to cause about 12 per cent of the blindness in the United States, the long and on the whole hopeful section on treatment will be eagerly read by present and future physicians dedicated to the prevention of blindness.

**COMPARATIVE ANATOMY OF THE EYE.** Jack H. Prince, F.B.O.A., F.S.M.C., F.R.M.S., F.Z.S. (London). Charles C. Thomas, Springfield, Ill., 1956. 399 p. \$8.50.

The author, assistant research professor in the department of ophthalmology, University Hospital, Ohio State University, covers this fascinating subject for those already familiar with the structure of the human eye. His book is not only a reference volume for students and more advanced specialists, but makes a unique contribution to the field, since it is based largely on the author's own researches and is illustrated with his own drawings and photographs.

Beginning with the comparative anatomy of the orbit, a subject in which Professor Prince has original material to offer, he discusses eye structures from the retina outwards. He supplies new information on the vertebrate optic nerve and on pupil patterns. The endless modifications of

eye structures are described and also assessed in terms of what the various animals need in their own patterns of life. Animals are diurnal, nocturnal or active at all times; some of them hunt, the others are hunted; and they are creatures of water, air or earth. These three factors determine the whole anatomy of the eye, and the author believes that the position of the eyes in the head and the structure of the orbits "are indissolubly linked with all the habit patterns mentioned."

A chapter on the eye of the invertebrates avoids any temptation to trace ancestral patterns for the vertebrate eye. Of value to students are a chapter on dissection procedures, a rapid reference table listing the ocular characteristics of each order of animals, and a glossary of species names.

**BLINDNESS IN ENGLAND, 1951-1954.** Arnold Sorsby. Ministry of Health. Her Majesty's Stationery Office, London, 1956. 53 p. 3s net.

Professor Sorsby's third review of blindness in England reveals the rapidly increasing group of aged blind, predominantly women, who have lost their vision not only because they are old but because they have neglected to take proper care of their eyes. The increasing life span accounts for most of the rise in the total registered blind who numbered 86,389 on March 31, 1952 and had grown to 93,622 by the end of 1954. The new registrations for 1954 tell the story: 69 per cent were over 70, and 36 per cent of those registering for the first time were over 80.

The degenerative changes of old age caused most of the blindness: senile cataract 26 per cent, macular lesions 22 and glaucoma 14 per cent. But while glaucoma victims had surgery in

six out of ten cases, 82 per cent of the persons blinded by cataract had received no treatment. This revelation by Professor Sorsby has caused much comment in English medical circles, as has his prediction that in another 20 years the blind census will mount to at least 140,000. In his recommendations for cutting down the incidence of blindness he urges closer cooperation between general practitioners and eye specialists, and an increase in clinical facilities so that cataract and glaucoma may be treated and surgery performed before the patient is too old to be a good operative risk.

At the opposite end of the age scale is the increase in infant blindness due to retrorenal fibroplasia, which has claimed about 600 victims. However, since oxygen given premature babies has been under strict control no new cases have been reported in England. This victory is so recent that it is not reflected in the present report. The earlier victory, over blinding infectious diseases, is revealed in the tables for children of preschool age which show that congenital anomalies are now responsible for 83 per cent of early blindness.

While only seven per cent of the total blind population belong to the 15 to 50 age group, these blind in the active years of life present special problems. One is the six per cent incidence of blindness from diabetes. About half the cases are caused by congenital defects, abiotrophic anomalies and myopia. Neurological afflictions, iritis and iridocyclitis, and trauma are prominent in the rest. Professor Sorsby sees hope in dealing with blinding conditions in persons under 50 years, not in expanding surgical facilities, "but in the creation of clini-

cal units which can draw on the potentialities of both ophthalmology and general medicine." Clinical research units and basic research, he feels, can eventually solve the complex problems of the blinding diseases.

**SERVICES FOR CHILDREN WITH VISION AND EYE PROBLEMS: A GUIDE FOR PUBLIC HEALTH PERSONNEL.**

American Public Health Association, New York, 1956. 112 p. Single copies, \$1.50; 4-24 copies, \$1.275; 25-99, \$1.20; 100-500, \$1.05; 500 or more, \$0.90.

This compact guide, the first to correlate medical, educational and social needs of the visually handicapped child, was prepared jointly by the Committee on Child Health of the American Public Health Association and the National Society for the Prevention of Blindness. As Drs. Samuel M. Wishik and Franklin M. Foote of these two organizations explain in their foreword, the public health personnel for whom this epitome was written includes physicians, nurses, administrators, non-medical professional persons and leaders of community organizations. It is the fifth in a series of APHA Guides on community services for handicapped children.

Children with visual handicaps are put into three groups, with estimates of their numbers in 1955. Sighted children of school age with eye problems, mainly refractive, are estimated at 8.5 million; partially seeing children, with a visual acuity of 20/70 or less in the better eye after the best correction possible, and with sufficient residual sight to use this as their chief channel of learning, numbered 68,000; and those legally blind (preschool and school) 12,400. Some of the children classified legally as blind can use their

sight to read large print. The partially seeing should be encouraged and helped to learn chiefly through sight.

All three groups need special medical, educational and social services in varying degrees, and those seriously handicapped require long-term care and supervision. The authors feel that "organization of services on a community basis gives the greatest assurance that all children needing special treatment and education will have the full range of resources available to them, regardless of their socioeconomic status."

Proceeding on this principle, the Guide discusses the causes and prevention of eye defects, case finding, diagnosis and planning for care, followed by sections outlining the special health and school services which should be available to visually handicapped children. The section on organization of community resources is based on material in the general Guide of the series, "Services for Handicapped Children," published last year. Appendices and a bibliography complete a unique report which should prove invaluable to all professional persons working to reduce children's visual handicaps to a minimum.

**SAMUEL GRIDLEY HOWE: SOCIAL REFORMER,**

1801-1876. Harold Schwartz. Harvard University Press, Cambridge, 1956. 335 p. \$6.00.

The "Comet-Apostle" of the great age of social reform, Dr. Howe is chiefly remembered today for his magnificent pioneer work in education of the blind. This first authoritative biography reveals many other guises—as a young surgeon in the Greek war of independence, as abolitionist, as reformer with Horace Mann of the pub-

## PROGRAM FOR EDUCATORS OF CHILDREN WITH IMPAIRED VISION

Summer Session • July 1 to August 9, 1957  
SYRACUSE UNIVERSITY • SCHOOL OF EDUCATION

The following courses are offered in cooperation with the American Foundation for the Blind, Inc., City of New York:

- Development and Education of the Pre-School Blind Child (July 8 to July 26)
- Principles and Methods of Teaching Braille
- Instructional Procedures in the Education of Blind Children

**Additional courses, workshops, curricula and demonstration school in:**

Administration  
Cerebral Palsy  
Crippled Children  
Deaf and Hard of Hearing  
Epileptic Children  
Gifted Children  
Hospitalized and Homebound Children

Mental Retardation  
Multiply Handicapped  
Psychology of Exceptional Children  
Remedial Reading  
Severely Retarded Children  
Speech Correction  
Vocational Rehabilitation

*For detailed information regarding courses, housing, tuition, and related matters, write DR. WILLIAM M. CRUICKSHANK, Director, Education Exceptional Children, School of Education, Syracuse University, Syracuse 10, New York*

lic school system, and as husband of the brilliant Julia Ward.

When he began work in 1832 in his school for the blind Dr. Howe had absorbed what little Europe knew about teaching the sightless. At once he launched out on original lines, creating his own techniques and making his own equipment. What is now the Perkins School for the Blind rapidly became one of the foremost agencies of its kind in the world.

His greatest sensation was his almost miraculous education of the deaf-blind Laura Bridgman, and he carried the principles laboriously developed in this experiment into work for other deaf-blind children, and also for the mentally handicapped. From the first he wanted to bring his blind pupils into closer contact with society, and reorganized Perkins about mid-

century to minimize their isolation.

This sympathetic biography reveals a gifted, fascinating personality who summed up much of the philanthropy of his times.

**OUT OF MY DARKNESS.** William Sheppard, in collaboration with Fritz Blocki. Frederick Fell, Inc., New York, 1956. 281 p. \$3.95.

Bill Sheppard developed interstitial keratitis when he was eight years old and after 21 years of blindness regained the sight of both eyes by successful corneal transplants. All through his blindness Sheppard was rebellious and bitter. Because of the attitude of the sighted toward him, he pretended to be normal, and bluffed his way through one job after another. This is one story of a blind man which has a happy ending made possible by modern surgery.

# Index to Volume XXVI: 1956

## SIGHT-SAVING REVIEW

### AUTHORS

- American Academy of Pediatrics, Committee on the Fetus and Newborn Infant. 3:147  
American Medical Association, Council on Industrial Health. (Bk. Rev.). 2:128  
American Ophthalmological Society, Transactions, 1955. (Bk. Rev.). 3:188  
American Public Health Association, Committee on Child Health. (Bk. Rev.). 1:64  
American Public Health Association. (Bk. Rev.). 4:252  
Athas, Daphne. (Bk. Rev.). 3:192  
Best, Alfred M. Company, Inc. (Bk. Rev.). 3:192  
Bailey, Capt. Robert W. 3:144  
Brooks, Van Wyck. (Bk. Rev.). 2:125  
Bruger, Maurice. (Bk. Rev.). 1:63  
Callahan, Alston. (Bk. Rev.). 4:249  
Clark, William B. 3:132  
Cosgrove, K. W. 2:92  
Currie, Dan. 1:14  
DeReamer, Russell. 1:24  
Delthil, Simone. (Bk. Rev.). 3:188  
Espino, Jose Manuel. (Bk. Rev.). 3:191  
Evanston, Illinois, School District No. 65. 3:156  
Farrell, Gabriel. (Bk. Rev.). 2:126  
Galisdorfer, Lorraine. 1:33  
Gasteiger, Hugo. (Bk. Rev.). 3:189  
Gibbs, Gordon E. 2:84  
Givner, Isadore. (Bk. Rev.). 1:63  
Goodenough, Florence L. (Bk. Rev.). 3:190  
Graham, Ray. 2:97  
Gutman, Eleanor B. 4:212  
Hallock, Grace T. (Bk. Rev.). 2:128  
Henderson, John W. 3:138  
Henrich, Laura Jane. 3:148  
Henry, J. F., Jr. 2:92  
Hoover, Donald D. 1:11  
Jacobziner, Harold. 2:86  
Kearns, Thomas P. 2:79  
Kellogg, Alicia W. 1:17  
Kuhn, Hedwig S. 1:20  
Lebensohn, James E. 4:201  
Lepard, Cecil W. 4:196  
Lindsay, John R., Editor. (Bk. Rev.). 3:189  
Lowenfeld, Berthold. (Bk. Rev.). 2:127  
National Education Association and American Medical Association, Joint Committee on Health Problems in Education. (Bk. Rev.). 3:190  
Ophthalmological Society of the United Kingdom, Transactions, 1955. (Bk. Rev.). 3:188  
Pollack, Philip. (Bk. Rev.). 4:248  
Prince, Jack H. (Bk. Rev.). 4:250  
Sager, Herman. 1:27  
Schneider, David M. 2:86  
Schneider, Leo. (Bk. Rev.). 3:191  
Schwartz, Harold. (Bk. Rev.). 4:252  
Sheppard, Wm. (Bk. Rev.). 4:253  
Sorsby, Arnold. (Bk. Rev.). 4:251  
Stevenson, Roger. 2:92  
U. S. Civil Service Commission. (Bk. Rev.). 1:63  
Vail, Derrick, Editor. 2:74. (Bk. Rev.). 3:189  
Vance, Marguerite. (Bk. Rev.). 3:192  
Welker, Edna Z. 3:163  
Wheatley, George M. (Bk. Rev.). 2:128  
World Health Organization. (Bk. Rev.). 3:189  
Yankauer, Alfred. 2:86

### SUBJECTS

#### CAUSES OF BLINDNESS

- Bengal Work Revived. Around the World. 3:172  
Blind Children Surveyed. (Japan). 4:235  
Blind Increase in Massachusetts. 1:30  
Blindness in Prague. Around the World. 2:112

Diagnosis and Treatment of Neurologic Eye Disease. Thomas P. Kearns. 2:79

Illinois Sets New Goals. 1:38

(The) Rise and Fall of Retrolental Fibroplasia in New York State. Alfred Yankauer, Harold Jacobziner and David M. Schneider. 2:86

WHO Studies Onchocerciasis. 1:31

Abstracts. 1:61; 2:123

#### CONFERENCES

1957 Joint Conference of NSPB and Pan American Association of Ophthalmology. 3:170; 4:233

1956 NSPB Conference. 1:6; 2:68

Pan American Congress at Santiago. 1:4

#### DRUGS

Hoxsey Hoax. 3:169

New Drug Endangers Eyes. (NP 207). 1:41

Present Status of Optic Atrophy. John W. Henderson. 3:138

Abstracts. 1:55, 56, 57, 58; 2:116; 3:175, 186

#### EDUCATION OF THE PARTIALLY SEEING

Advanced Workshop at Syracuse University. 4:228

Integration of Handicapped. (Scotland). Around the World. 3:174

(The) Preschool Child and Books. Lorraine Galisdorfer. 1:33

Recommended Basic Course for Preparation of Teachers of Partially Seeing Children. 4:226

Social and Emotional Adjustment of School Children with Eye Handicaps—A Multi-Discipline Approach. Evanston, Ill., School District No. 65. 3:156

Upgrading Educational Facilities for Children Who are Partially Seeing. Ray Graham. 2:97

Upgrading Educational Facilities for Partially Seeing Children—A Working Conference. 2:104

Virginia's Special Classes. 1:41

(The) Vision of the Preschool Child. Cecil W. Lepard. 4:196

## EYE DISEASES AND DEFECTS

### Anisometropia

Abstract. 1:52

(The) Art of Seeing with Little Sight.  
Alicia W. Kellogg. 1:17

### Cataract

Casanova and Cataracts. 1:23

Cataracts and Rubella. 1:38

Surgery Given Thousands. (India).

Around the World. 1:44

Witch Doctor Finds New Magic.  
(Union of South Africa). Around the  
World. 3:174

Abstracts. 1:47, 62; 2:118, 119, 120;  
3:177

### Cerebral Palsy

Abstract. 1:49

### Conjunctivitis

"Greeley Disease" in Iowa. 1:40

Shipyard Conjunctivitis. (Italy).

Around the World. 2:113

Abstract. 3:186

### Diabetic Retinopathy

Research in Diabetic Retinopathy.

Gordon E. Gibbs. 2:84

Abstracts. 3:175, 176

### Glaucoma

City Offers Glaucoma Tests. 1:37

Exhibit Features Glaucoma Detection.  
3:154

Glaucoma Detection in New Jersey.  
2:110

Glaucoma Follow-up. (Florida). 2:110

Glaucoma Tests in Helsinki. Around  
the World. 1:42

Illinois Sets New Goals. 1:38

Abstracts. 1:46; 2:121, 122, 123, 124;  
3:184, 185; 4:244, 245

### Heredity

Abstracts. 2:123, 124; 4:237, 241

### Myopia

Abstracts. 1:51, 52, 53; 2:117

### Neurology

Diagnosis and Treatment of Neuro-  
logic Eye Disease. Thomas P. Kearns.  
2:79

Night Blindness in RAF. (Great  
Britain). Around the World. 2:112

### Nutrition

Night Blindness Pandemic. (For-  
mosa). Around the World. 1:42  
Abstracts. 1:57, 58; 3:177

### Onchocerciasis

WHO Studies Onchocerciasis. 1:31

### Optic Atrophy

Present Status of Optic Atrophy.  
John W. Henderson. 3:138

### Retrolental Fibroplasia

Activities in Michigan. 3:155  
Connecticut Developments. 2:110

Illinois Sets New Goals. 1:38

Patz and Kinsey Receive Lasker  
Award. 4:223

Physicians and RLF. 4:231  
(The) Rise and Fall of Retrolental  
Fibroplasia in New York State. Alfred  
Yankauer, Harold Jacobziner and  
David M. Schneider. 2:86

RLF Curbed in Auckland. Around  
the World. 1:45

RLF in Copenhagen. Around the  
World. 1:42

RLF Stopped in Oregon. 2:73

Statement Concerning the Use of  
Oxygen in the Treatment of Premature  
Infants. American Academy of  
Pediatrics, Committee on the Fetus  
and Newborn Infant. 3:147

"Treatment" for RLF. (Gr. Britain).  
4:234

Abstracts. 1:47, 48; 2:114, 115, 117;  
3:178, 179; 4:236

### Retinal Detachment

Abstract. 4:243

### Retinitis Pigmentosa

Abstract. 3:180

### Rubella

Cataracts and Rubella. 1:38

Menace of Rubella. 2:111

### Strabismus

(The) Vision of the Preschool Child.

Cecil W. Lepard. 4:205

Abstracts. 1:49, 50, 51, 54; 4:237

### Syphilis

New York Syphilis Survey. 3:168

Syphilis among Migrants. 1:32

Triple Threat to Eyes. (Madagascar).

Around the World. 1:45

### Toxoplasmosis

Abstract. 2:117

### Trachoma

Ophthalmology and the Illinois So-  
ciety for the Prevention of Blindness.

Derrick Vail. 2:74

Trachoma on the Wane. (Japan).

Around the World. 1:44

Trachoma Pilot Project. (India). 4:234

Trachoma Research. (Jordan). Around  
the World. 3:173

Vast Extent of Trachoma. 3:169

War on Trachoma. (Egypt). Around  
the World. 3:171

Abstract. 3:181

### Uveitis

Abstract. 1:47

### EYE INFECTIONS

Eye Trays—Contamination and Medica-  
tion. Hedwig S. Kuhn. 1:20

Abstracts. 1:54, 57

### EYE INJURIES

Blasting Caps Destroy Eyes. 4:217

Davy Crockett Craze. (Great Britain).  
Around the World. 3:171

Eye Accidents in St. Louis. 3:168

Eye Accidents. (Stockholm). 4:235

Eye Injuries from Christmas Toys. Dan  
Currie. 1:14

Eye Safety in Navy. 1:39

Eye Trays—Contamination and Medica-  
tion. Hedwig S. Kuhn. 1:20

Flashlight Effect on Eyes. 1:30

Growth of Wise Owl Club. 1:64

Infrared and Ultraviolet Transmittance  
Characteristics of Plastics. 1:19

Injury Cases in Court. 1:39

Medical Texts in Court. 1:22

New Magnet Tested. 1:8

Plantations Safeguard Eyes. (Hawaii).  
Around the World. 2:112

Sperry's Ten-Year Record. Herman Sager.  
1:27

(A) Study of Non-Occupational Eye In-  
juries. K. W. Cosgrove, J. F. Henry, Jr.,  
and Roger Stevenson. 2:92

- Your Eye Program—Success or Failure?  
Russell DeReamer. 1:24
- Abstracts. 1:49, 55, 59; 3:185, 186, 187
- EYE PHYSIOLOGY**
- Abstracts. 1:55; 3:182; 4:246
- ILLUMINATION**
- Abstract. 1:61
- INDUSTRY**
- (The) Army's Occupational Vision Program. Capt. Robert W. Bailey, MSC. 3:144
- Factory Workers Screened. (Scandinavia). 4:234
- Hazards in Welding. 3:162
- Miners' Eye Troubles. (Great Britain). Around the World. 1:43
- Sperry's Ten-Year Program. Herman Sager. 1:27
- 10,000th Wise Owl Honored. 4:232
- Your Eye Program—Success or Failure?  
Russell DeReamer. 1:24
- Abstracts. 3:183, 185
- See EYE INJURIES
- LENSES**
- Display of Optical Aids at Braille Institute. 4:210
- Infrared and Ultraviolet Transmittance Characteristics of Plastics. 1:19
- Mail Order Glasses. 4:230
- Optical Aids for Subnormal Vision. James E. Leboensohn. 4:201
- Optical Aids Program. 3:167
- Spectacle Lens Tester. 1:40
- Abstracts. 1:54, 60; 3:181, 182
- OPHTHALMOLOGY**
- Anniversary Celebrated. (Philippines). Around the World. 2:113
- Eye Services Abundant. (Israel). 4:235
- Luis Sanchez Bulnes, M.D. 1:7
- Correspondence Society Formed. 3:143
- Dr. Bietti Honored. (Italy). Around the World. 3:173
- Duke-Elder Honored. (Great Britain). Around the World. 3:171
- Eye Institute Opened. (India). Around the World. 3:172
- Ophthalmology and the Illinois Society for the Prevention of Blindness. Derrick Vail. 2:74
- Training Grants. 4:230
- Abstracts. 1:62; 2:113, 120
- ORTHOPTICS**
- Delta Gamma Fellowships. 4:232
- PSYCHIATRIC AND SOCIAL FACTORS**
- Medical Social Work with Eye Patients. Laura Jane Henrich. 3:148
- Abstract. 2:119
- PUBLIC EDUCATION**
- Campaign Alerts Thousands. 4:231
- Use of Mass Media to Inform the Public.  
Donald D. Hoover. 1:11
- RESEARCH**
- Ford Grants to Hospitals. 2:110
- Gift for Research. (Australia). 4:234
- In the Service of Sight. Helenor Campbell Foerster. 1:9
- New Fellowships. 2:73
- Reflections on Research. 3:153
- Research and the Public. 3:162
- Research in Diabetic Retinopathy. Gordon E. Gibbs. 2:84
- Abstracts. 1:54, 55
- SIGHT RESTORATION**
- Eye Banks Around the World. (Great Britain). Around the World. 2:112
- Eye Banks Federated. 1:38
- First Eye Bank in Iowa. 1:18
- Illinois Sets New Goals. 1:38
- Pope Approves Corneal Grafts. (Italy). Around the World. 3:172
- SPORTS**
- Eye Safeguards for Athletes. 3:167
- TRAFFIC**
- Case of the Blind Driver. 3:153
- Colored Roads. (Italy). Around the World. 3:173
- Cyclists Need Safety Glasses. 1:8
- Dazzle and Glare. (Great Britain). Around the World. 3:171
- Driver Eyesight Study. 3:153
- Road Safety Studies. 1:26
- Safety Togs for Pedestrians. 1:18
- VISION TESTS**
- Activities in Michigan. 3:155
- Colorado School Program. 2:103
- Delta Gamma Fellowships. 4:232
- Follow-Through Record. (Philadelphia). 3:167
- Mobile Clinic Reports. (Pennsylvania). 3:168
- (An) Ophthalmic Survey of Sample Populations in Mississippi and Louisiana. William B. Clark. 3:132
- School Vision Screening—A Comparison of Two Methods. Eleanor B. Gutman. 4:212
- School Vision Screening in Rockford. Edna Z. Welker. 3:163
- Workshop on Vision Screening. (Ohio). 4:229
- Abstracts. 1:50, 52; 2:118; 4:238, 239, 240, 242
- VOLUNTARY AGENCIES**
- Ophthalmology and the Illinois Society for the Prevention of Blindness. Derrick Vail. 2:74
- MISCELLANEOUS**
- Award of Migel Medal. 4:229
- Deaths  
Judge Ned H. Smith. 4:225  
Father Schwittala Honored. 4:231
- 
- DEPARTMENTS**
- Around the World. 1:42; 2:112; 3:171; 4:234
- Books and Pamphlets. 1:63; 2:125; 3:188; 4:246
- Current Articles. 1:46; 2:114; 3:175; 4:236
- Notes and Comment. 1:38; 2:110; 3:167; 4:230
- 
- ADVERTISERS**
- American Optical Company. 1:1; 2:65; 3:129; 4:193
- Chilton Company. 4:249
- Columbia University Press. 3:191
- Good-Lite Mfg. Co. 2:67; 3:131; 4:195
- Harvard University Press. 2:127
- Syracuse University. 4:253
- Welch Allyn, Inc. 1:3

